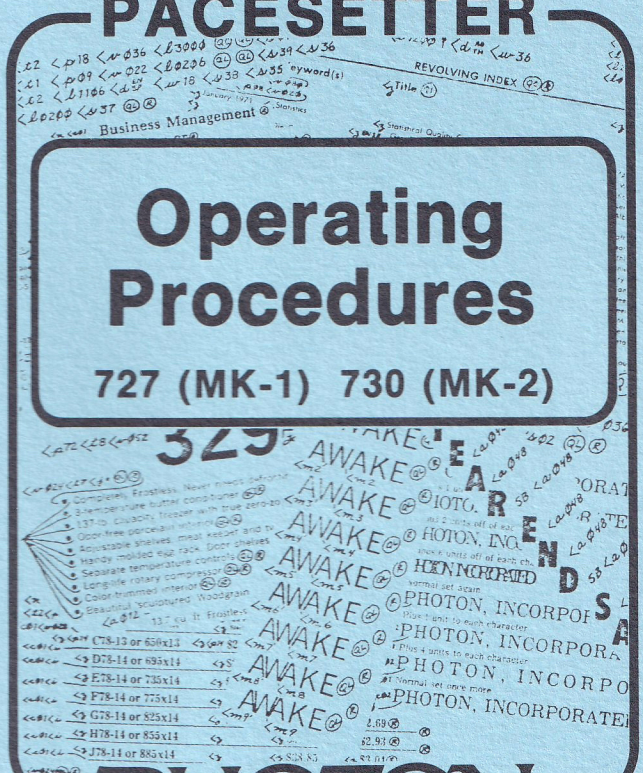
PACESETTER



Operating Procedures

727 (MK-1) 730 (MK-2)

PHOTON

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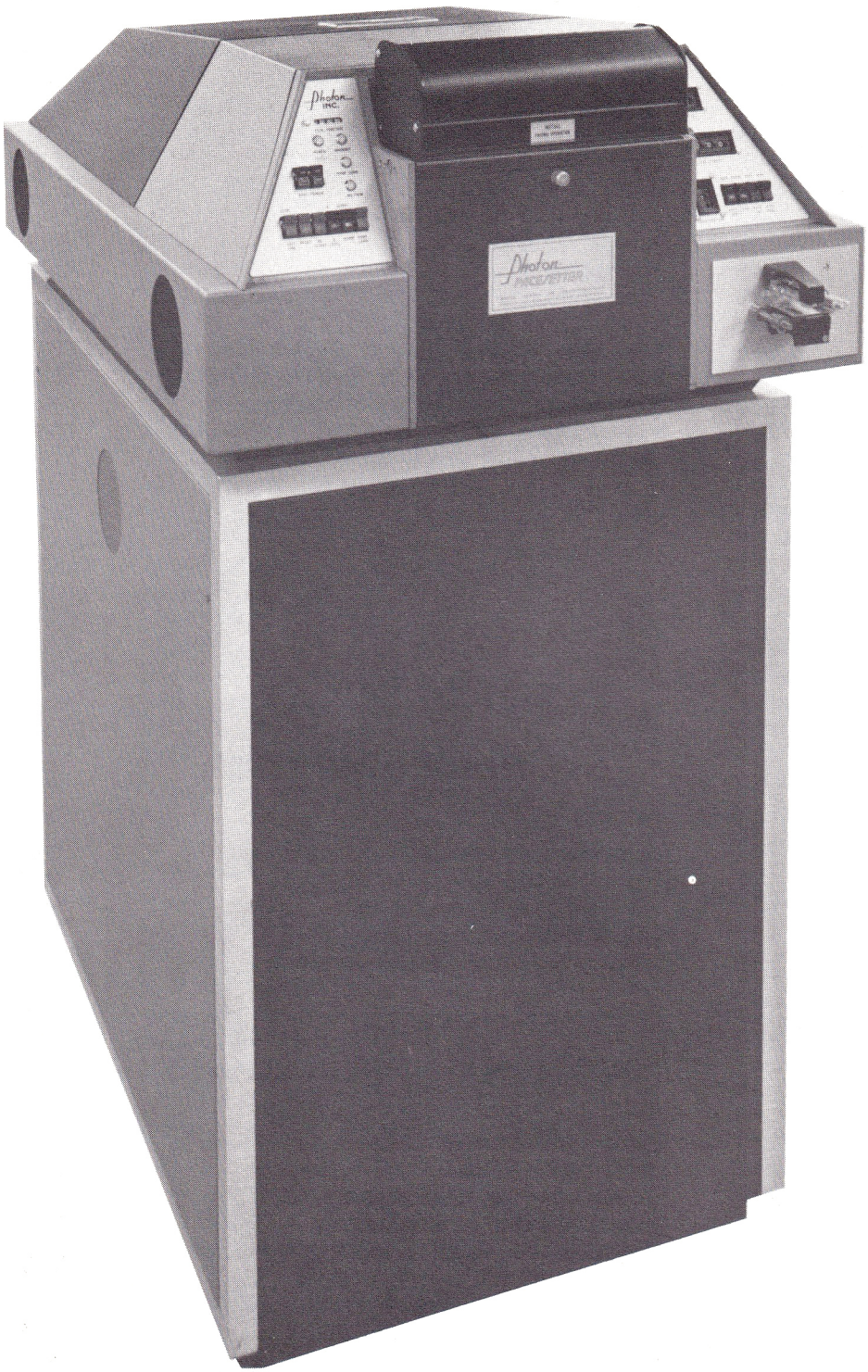


PHOTON PACESETTER

SECTION 1
OPERATION

1.0 INTRODUCTION

This section contains instructions and information necessary for the operation of the Pacesetter. Included in this section are an explanation of the mode of operation, operator controls, and indicators, and instructions for preparing the machine for receipt and processing of job tapes.

1.1 MODE OF OPERATION

After installing film or photosensitive paper the operator must load into the machine's memory the main program and lens initialization tapes.

Once these tapes have been processed and the control panel switches have been properly positioned for manual or automatic and justified or unjustified operation, the machine is ready to receive job tapes.

The tape code for a command is an address in memory which contains that command. The tape code for an alphanumeric character is an address in memory which contains a machine code. This machine code, which was loaded into memory as a part of the main program tape is then stored in another section of memory.

When the command and character codes for a complete line are received, the computer program performs all the operations necessary for that line (lens position, typeface, spacing, etc.), the mirror carriage is moved and the first character in memory is examined in synchronism with the character disc. When comparison is completed, a flash command is generated causing the flash tube to fire and expose the character, via the mirror carriage and selected lens, onto the film or photosensitive paper. This process is continued until all the data for that line has been printed.

If at the end of a line there was a carriage return code, the mirror carriage is returned to its beginning position, new command and character codes are processed and the characters are exposed for that line.

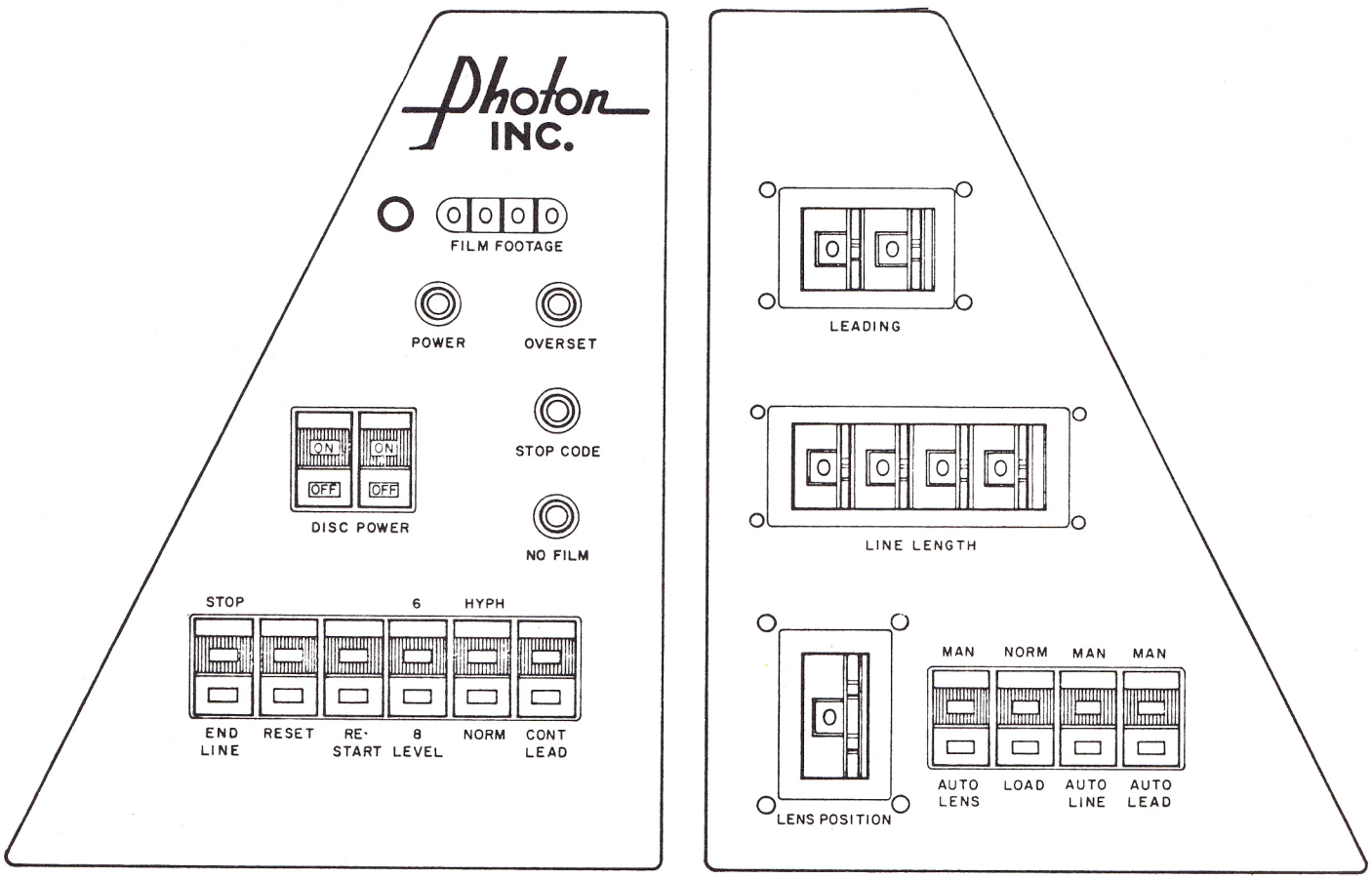


Figure 1-1 Operator Display and Control Panels

Table 1-1 Left Hand Control and Indicator Panel

CONTROL	TYPE	DESCRIPTION
FILM FOOTAGE	Four digit resettable counter	Displays numerically the amount of film or photosensitive paper used. White pushbutton to left of counter will reset counter to all zeros when pressed. Right hand digit represents a tenth of a foot.
POWER	White indicator lamp	Illuminates when POWER ON/OFF switch is in the ON position and AC power is applied to machine.
OVERSET	White indicator lamp	In the NORM position of the HYPH/NORM switch this lamp will illuminate when the line length value for a particular line is exceeded.
STOP CODE	White indicator lamp	This indicator will illuminate when a stop code is read from tape, keyboard or card reader. In addition, with the HYPH/NORM switch in the HYPH position and the STOP/END LINE switch is pressed and released, the indicator will illuminate at the end of a paragraph. In the NORM position and when the STOP/END LINE switch is pressed and released, illumination will occur at the end of a line. Processing of tape ceases whenever the STOP CODE lamp is illuminated.
NO FILM	White indicator lamp	When film or photosensitive paper supply is exhausted, this indicator will illuminate.
DISC ON/OFF	Two position rocker switch	In the ON position, the carriage and memory circuits are activated for Pacesetter Models 730 (MK-2) and 732 (MK-3). For Model 727 (MK-1) the disc switch activates the memory circuits only. Refer to POWER ON/OF switch description for powering up and powering down procedures.
POWER ON/OFF	Two position rocker switch	Illuminates the POWER indicator and applies AC power to all required circuits. When powering up; press and hold RESET switch, press POWER switch to ON position, press DISC switch to ON position, and release RESET switch. When powering down first press DISC switch to OFF position and then press POWER switch to OFF position.
STOP/END LINE	Two position rocker switch	When pressed and released, this switch will illuminate the STOP CODE indicator and cease processing tape at the end of a paragraph, if the HYPH/NORM switch is in the HYPH position. In the NORM position, the STOP CODE indicator will illuminate and tape processing will cease at the end of a line.
RESET	Two position rocker switch	Conditions computor for start of new machine operation when pressed and released.
RESTART	Two position rocker switch	Press and release of this switch will initiate machine operation. It will also restart operation if the machine is stopped during or after normal operation. If pressed and released after a stop code is read from tape, keyboard or card reader, the film or paper will advance 800 points so that exposed copy will be contained in the output cassette.
6/8 LEVEL	Two position rocker switch	Conditions logic circuits for receipt of 6, 7 or 8 level tape inputs. Must be in the 6 position when using 6 or 7 level tape. Main program and lens initialization tapes are 8 level.
HYPH/NORM	Two position rocker switch	In the HYPH position, the machine will break the line at a preset value and hyphenate if necessary to end that line. With switch in NORM position, a carriage return code on the tape will determine end of line.
CONT LEAD	Two position rocker switch	This switch, when pressed and held during a stop condition provides continuous leading of film or paper. Release of switch stops leading. The operator must assure that the slide switch located behind the magazine assembly cover to the left is in the down position (forward) before processing tapes. The up position (reverse) is used only if film or paper should become jammed in the take-up rollers.

Table 1-2 Right Hand Control Panel

CONTROL	TYPE	DESCRIPTION
LENS POSITION	Sixteen position thumbwheel switch	Manual input for lens position when MAN/AUTO LENS switch is in MAN position
LEADING	Two 10-position thumbwheel switches	Manual input for leading (line spacing) in points when MAN/AUTO LEAD switch is in MAN position. Five to 30 point equals ½ points of lead and 36 to 72 point equals whole points of lead. Tape code input is ½ points for all sizes, 5-72 point.
LINE LENGTH	Four 10-position thumbwheel switches	Manual input for line length when MAN/AUTO LINE is in MAN position. Two switches on left represent picas and two on the right represent points (12 points equal 1 pica).
NORM/LOAD	Two position rocker switch	This switch must be in the NORM position when processing job tapes or inputs from a keyboard or card reader. It must be in the LOAD position when loading main program and initialization tapes.
MAN/AUTO LENS	Two position rocker switch	In MAN position this switch allows manual selection of a lens from the LENS POSITION switch. In AUTO position, lens selection is inputted from job tape.
MAN/AUTO LINE	Two position rocker switch	With this switch in the MAN position, selection of line length is manually allowed from the LINE LENGTH switches. In AUTO position, line length is provided from job tape.
MAN/AUTO LEAD	Two position rocker switch	The MAN position of this switch allows manual selection of leading values from the LEADING switches. In AUTO position, leading values are contained on job tapes.

When a stop code is present at the end of tape, the last line is processed and the STOP CODE lamp on the left hand control panel will illuminate. This indicates to the operator that the job is complete and the film or photosensitive paper is ready to be developed.

1.2 DISPLAY AND CONTROL PANELS

The operator's display and control panels (Figure 1-1) are located to the left and right of the film magazine assembly. All controls are functionally arranged to facilitate operation. The black rocker switches are two position type and the red rocker switches are two position momentary contact type. A description of these controls and indicators is contained in Tables 1-1 and 1-2.

1.3 INPUT AND OUTPUT CASSETTES

To install the input cassette and output cassette proceed as follows:

1. Remove box of photographic material and output cassette from shipping container.
2. Open magazine assembly hinged cover by turning knurled captive screw.
3. If using 10 inch wide paper remove input cassette adjustable holder by loosening two wingnuts securing holder.
4. Pull approximately 6 inches of material from the cassette and place into assembly with emulsion side toward rear opening. Adjust cassette holder for center position of magazine assembly if copy width is less than 10 inches.
5. Adjust Allen screw slide guides on bottom roller for centering proper width of paper being used.
6. Release two tension arms (one on each side of assembly) and place slide switch at left side to the down position.
7. Place the power ON/OFF switch to the ON position and press and release the RESET switch.
8. While guiding material under top roller against back plate with one hand, press and hold the CONT LEAD switch until material exits from slot on top of assembly.
9. Check that copy remained between slide guides on bottom roller and is centered in the slot opening. Adjust if necessary.

10. Secure two tension arms, close and fasten hinged cover. Close top cover of machine and assure that all panels are in place.
11. Press and release white button beside FILM FOOTAGE indicator and press and hold the CONT LEAD switch until the material has exited approximately one foot out of the slot opening. Reading on FILM FOOTAGE indicator should be 0010. Right hand digit is in tenths.
12. Grasping the film cutter knob on the right side of the machine, pull to its extreme right position. Remove and discard exited material.
13. Push cutter to the left until it is fully seated in position and press and release RESET button beside FILM FOOTAGE indicator.
14. With decal on front of output cassette facing operator, place cassette on top of assembly assuring that cassette opening is properly mated with slot opening.

NOTE

If copy should become jammed in rollers the top cover, including the exit slot, may be removed by pulling two spring loaded plungers (one on each side of cover) toward center and pulling straight out.

When required, material travel may be reversed by placing slide switch in up position and pressing the CONT LEAD switch. Assure that slide switch is in down position for normal operation.

1.4 MACHINE PROGRAMMING

With the machine properly loaded with desired material the operator is now ready to load program and lens initialization punched paper tapes via the tape reader. Table 1-3 contains, in sequential order, a description of the information on the program tape. This description is also printed on the tape itself. A description of the information contained on the lens initialization tape is shown in Table 1-4. To load these tapes proceed as follows:

1. Place the POWER ON/OFF switch to the ON position.
2. Press and release the RESET switch.
3. Press and hold RESET switch while pressing DISC switch.
4. Place the 6/8 LEVEL switch to the 8 position.
5. Remove front panel of machine by turning two screws on the panel 90°.
6. Press and release LOAD switch on maintenance panel.
7. Install front panel and secure to machine.
8. Expose read-head of tape reader by pressing release button on front of reader.
9. Place first section of program tape (LOADER) into reader as shown in Figure 1-2 and assure that sprocket holes of tape are placed over reader capstan pins.
10. Close read-head cover until it latches in place.
11. To start tape movement press and release the RESET and RESTART switches.
12. When the blank portion of tape appears under the read-head press and release the RESET switch.
13, Place the NORM/LOAD switch to the LOAD position.

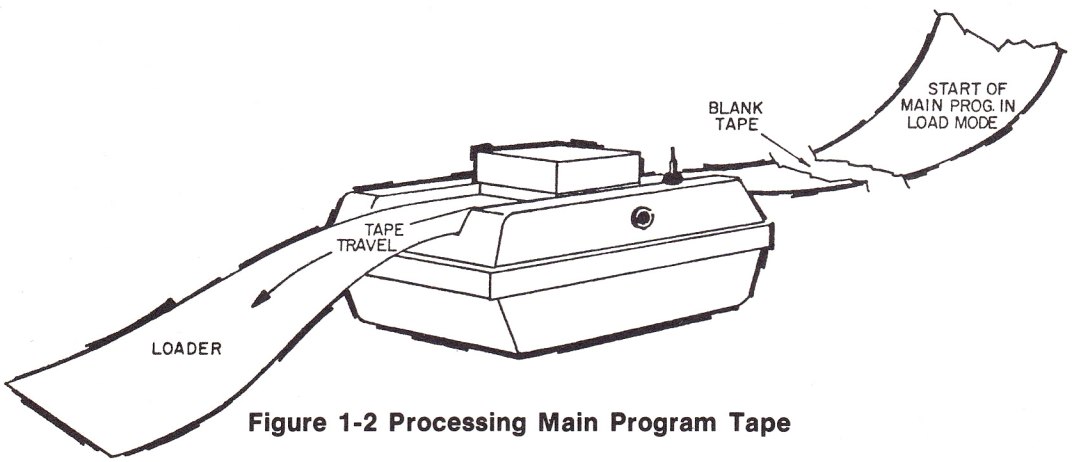


Figure 1-2 Processing Main Program Tape

14. To move tape press and release the RESTART switch.
15. The second section of tape (MAIN PROGRAM IN LOAD MODE) will now be loaded into the machine. At the end of this loading a stop code on the tape will automatically stop tape movement.

Table 1-3 727 MK-1 Program Tape

1. Loader
2. Main Program in Load Mode
3. Use to Run 6 Level Tape
4. Use to Run 8 Level Tape
5. Use to Initially Set Typeface 3 UPLRUM
6. Wire Service Stripping Mode
7. Wire Service Box Scores
8. Wire Service Stock Mode, Upper Rail Denotes Start of Visual (AP)
9. Wire Service Stock Mode. Bell Denotes Start of Visual (UPI)
10. Use to Go Out of Wire Service Mode
11. ½ Unit Machine Patch
12. ¼ Unit Machine Patch

Table 1-4 730 MK-2 Program Tape

Part 1

1. Loader
2. Main Program in Load Mode

Part 2

1. 6 Level Patch
2. 8 Level Patch
3. Set Typeface 3
4. 4 HI, 0 LO
5. 3 HI, 2 LO
6. 2 HI, 4 LO
7. 1 HI, 6 LO
8. 8 LO
9. 713 Compatibility
10. HI-Speed Wire Service
11. HI-Speed Out of Wire Service
12. HI-Speed Wire Service UPI Stock
13. HI-Speed Wire Service AP Stock
14. HI-Speed Box Scores
15. LO-Speed Wire
16. LO-Speed Out of Wire Service
17. LO-Speed Wire Service UPI Stock
18. LO-Speed Wire Service AP Stock
19. LO-Speed Box Scores

Table 1-5 Lens Initialization Tape Contents

1. Smallest Available Lens Initialization
2. First Lens Capable of Setting 45 Picas - Initialization
3. Multiflash
4. Size

Using Table 1-3 as a guide the operator must now process the other tape sections according to the desired input operation (wire service, stock market, etc.). In any case, section 3 or 4 (use of 6 or 8 level tape) must be loaded into machine. To load a particular section remove tape from reader, move tape to the start of that section, install in reader, and press and release the RESTART switch.

After the main program is loaded into machine the lens initialization tape must be processed. The operator must select 6 pt. or 9 pt. and load this into the machine. Tape will advance until a stop code at the end of section 1 or 2 ceases operation. Press and release of the RESTART switch will process section 3 (MULTIFLASH) at the end of which a stop code will stop tape travel. For the fourth section (SIZE) to be loaded into the machine press and release the RESTART switch. This section also contains a stop code which stops tape advancement. Place the NORM/LOAD switch to the NORM position. The tape may now be removed and the machine is ready to accept job tapes.

Whenever a new type disc is installed an additional tape (character widths) must be loaded into the machine. To load width tape: place 6/8 LEVEL switch to the 8 position, the NORM/LOAD switch to the LOAD position, load the tape, and press and release the RESET and RESTART switches. After tape is loaded place NORM/LOAD switch to NORM position and place 6/8 LEVEL switch to position of tape level being used.

1.5 PROCESSING JOB TAPES

The machine is ready to process job tapes when photographic material has been installed and program, width tape and lens initialization tapes have been loaded into memory. To process job tapes proceed as follows:

1. Place the POWER ON/OFF switch to ON, press and release RESET switch, and press and hold RESET while pressing DISC ON/OFF switch to ON.

2. If command codes are not on tape (line length, leading, and lens position) place the MAN/AUTO LENS, MAN/AUTO LINE, and MAN/AUTO LEAD switches to their MAN positions and position their associated thumbwheel switches for required inputs. The information required is normally written at the beginning of the job tape.
3. If command codes are on tape, the switches mentioned in (2) should be in their AUTO position.
4. Place the NORM/LOAD switch to the NORM position and the HYPH/NORM switch to the HYPH position if copy is to be hyphenated and justified.
5. Place 6/8 LEVEL switch to level of tape being used. Position 6 is used for 7 level tape.
6. Place tape in reader assuring that bit 1 is facing operator and close and latch the read-head cover.
7. Press and release the RESET and RESTART switches.

The machine will now process the job tape until a stop code is detected and STOP CODE indicator is illuminated. If manual operation is being performed and tape stops prior to end of tape it means the operator must reposition the thumbwheel switches. This information is normally written on the job tape after the stop code.

During automatic operation the stop code is detected and the STOP CODE indicator is illuminated at the end of a job tape. The copy is now ready for developing.

1.6 REMOVING OUTPUT CASSETTE

To remove the output cassette proceed as follows:

1. With STOP CODE indicator illuminated, press and release the RESTART switch. This will automatically advance the copy 800 points so that exposed copy will be contained in the cassette.
2. Grasp the film cutter knob on right side of machine and pull to extreme right position.
3. Push cutter to full left position until it is fully seated.
4. Cassette may now be removed from machine by lifting straight up.

SECTION II
APPLICATIONS

2.0 INTRODUCTION

This section provides the information necessary for obtaining full programming capabilities from the Pacesetter. Included in this section are: the various code formats, a description and example of each function code, an introduction to binary and hexadecimal numbering systems, and procedures for changing the width of a character or changing the status table contents.

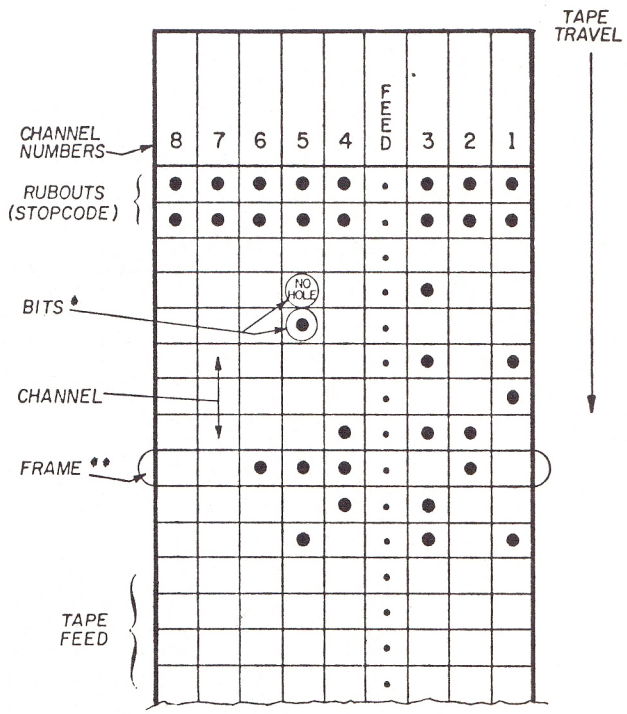
Function Codes 7th Level = Flag Code	7	6	5	4	Tape Feed	3	2	1	TTS Codes
Stop	○				○				Tape Feed
Typeface	○	●			○				T
			●		○				Return
Load Stored Codes	○	●	●		○				O
Change Set Width	○			●	○				Space Band
Normal Mode	○		●	●	○				N
Hyphenation Mode	○	●		●	○				H
Mortice (Kern)	○	●	●	●	○				M
					○	●			F/B
Insert Leader	○			●	○	●			I
Begin Runaround	○		●		○	●			R
Call Format	○		●	●	○	●			C
Line Length	○	●			○	●			L
Point Size	○	●		●	○	●			P
Get Stored Codes	○	●	●		○	●			G
Leading	○	●	●	●	○	●			V
End Runaround	○				○		●		E
Add Lead	○				○	●	●		A
Store Format	○			●	○		●		S
Allow Flash	○			●	○	●	●		U
Define Leader			●		○		●		D
Define Vertical Rule			●		○	●	●		J
Kill Word	○		●	●	○		●		F
Kill Line	○		●	●	○	●	●		K
Tabulation	○	●			○		●		Z
Store Leader Width	○	●			○	●	●		W
Supershift	○	●		●	○		●		Y
Quad Right	○	●		●	○	●	●		Q
No Flash Next Char.		●	●		○		●		B
		●	●		○	●	●		Shift
Cancel Indent	○	●	●	●	○		●		X
		●	●	●	○	●	●		Unshift
					○			●	Thin Space
Indent Text	○				○		●	●	3
					○	●		●	Lower Matrix
					○	●	●	●	$
				●	○			●	Add Thin SP
				●	○		●	●	EM Space
				●	○	●		●	8
				●	○	●	●	●	7
			●		○			●	Apostrophe
Zero Lead	○		●		○		●	●	Hyphen
Indent Right	○		●		○	●		●	4
			●		○	●	●	●	Bell/Flag
Divide Leader Space	○		●	●	○			●	Comma
			●	●	○		●	●	Quad Left
			●	●	○	●		●	En Space
			●	●	○	●	●	●	Upper Matrix
Force Justification	○	●			○			●	5
		●			○		●	●	Parenthesis
		●			○	●		●	V. Rule
Indent Left	○	●			○	●	●	●	2
		●		●	○			●	EM Leader
Indent Both	○	●		●	○		●	●	6
Zero Width	○	●		●	○	●		●	0
		●		●	○	●	●	●	En Leader
		●	●		○			●	9
		●	●		○		●	●	Upper Rail
		●	●		○	●		●	Semicolon
		●	●		○	●	●	●	Lower Rail
Cancel Flash	○	●	●	●	○			●	Period
1-Unit Space	○	●	●	●	○		●	●	1
		●	●	●	○	●		●	Quad Center
		●	●	●	○	●	●	●	Ignore

Figure 2-1 TTS CODES (Photon Designation)

2.1 CODE FORMATS

The code format most often used to select characters and functions of the Pacesetter system is known as the Teletypesetter (TTS) six-level code. Other means of communication are with the optional online keyboard or paper tapes from off-line keyboards such as the Friden Justowriters. When using off-line keyboards, a special status table must be loaded into the main program prior to processing job tapes. In TTS coding, when using paper tape, code combinations are obtained by perforating a maximum of six holes at predetermined locations for the character or function. Figure 2-1 illustrates the standard TTS codes for all characters and functions. The six level code 0 through 5 in TTS is respectively designated 1 through 6 by Photon.

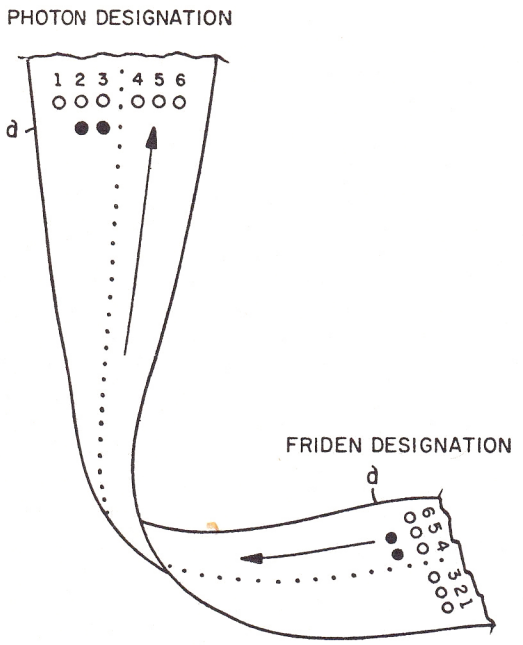
Figure 2-2 illustrates and explains the paper tape format used by Photon. The seventh and eighth channel, used in loading the main



*A BIT IS PRESENCE OR ABSENCE OF A HOLE.

**CODE MAY BE ONE OR MORE FRAMES.

— Figure 2-2 Photon Paper Tape Format —



— Figure 2-3 Friden/Photon Designations —

program and lens initialization tapes, are for internal machine operations. The seventh bit may be used in place of the Bell code (para. 2.2) during preparation of job tapes.

The rubout codes shown on Figure 2-2 are only used to stop operations when the machine is in the LOAD mode. To produce a STOPCODE and halt operations in NORMAL mode perforate a tape frame to produce BELL CODE (refer to Figure 2-1) and follow it with a TAPE FEED frame (no perforations).

The Friden six level code is the same as TTS except for their numeric order. The TTS "0" (Photon "1") is a Friden "6" level. To be compatible with TTS and Photon coding turn tape over before inserting into reader as shown on Figure 2-3.

The standard Justowriter seven-level coding arrangement is different from TTS as shown on Figure 2-4.

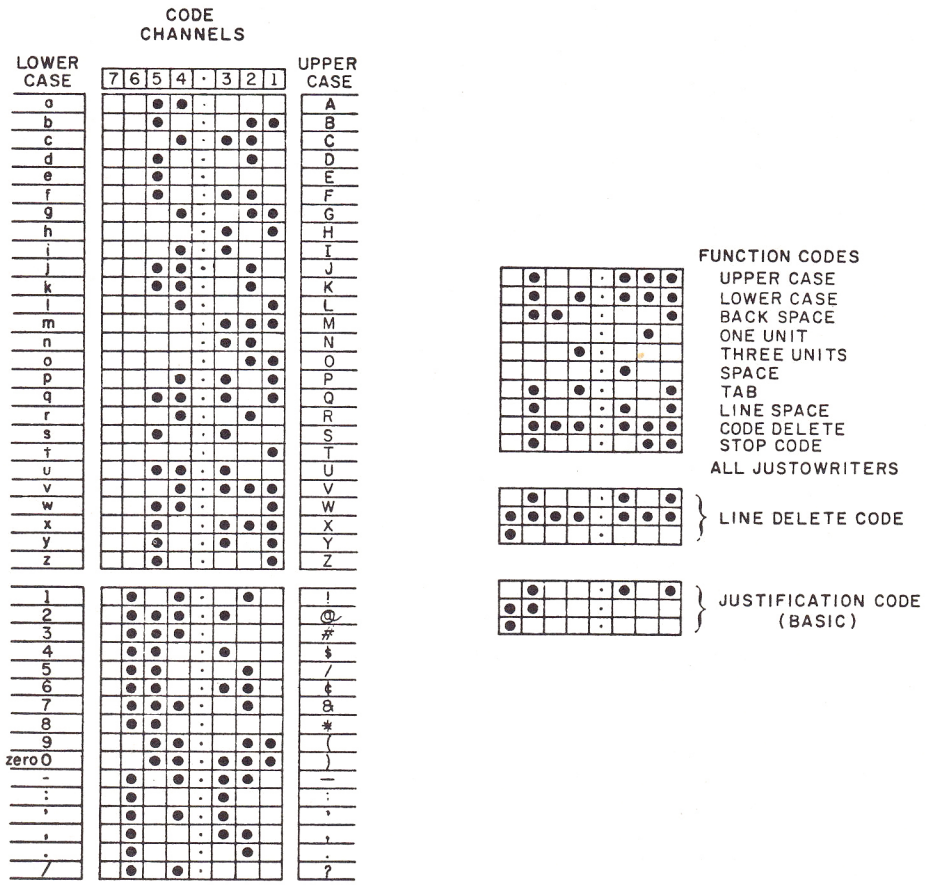


Figure 2-4 Justowriter Codes

2.2 FUNCTION CODES

The BELL CODE notifies the Pacesetter computer that information which follows should not be read as text but as a function. The BELL CODE is followed by a character and this character, for most functions, is followed by one or more digits or characters as shown in Table 2-1.

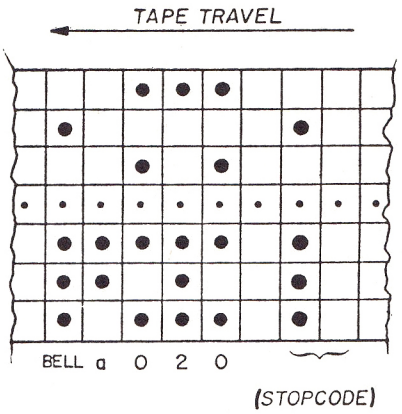
As an example, Figure 2-5 illustrates the function code required for adding 10 points of lead. The BELL and "a" represent the function for adding lead and the 020 represent half points of lead to be added.

Table 2-1 is a quick reference index to all function codes. The following paragraphs describe and provide examples of the Pacesetter function codes. The figure below will represent the Bell Code in this manual.

< = Bell Code

Table 2-1 Pacesetter Function Codes

FUNCTION CODE	DESCRIPTION
< a + 3 digits	Add lead
< b	No flash (next character)
< c + 2 digits	Call format
< d + 1 character	Define leader character
< e + 2 digits	End runaround
< f	Kill word
< g + 1 character	Get stored codes
< h	Hyphenation mode
< i	Insert leader
< j + 1 character	Define vertical rule
< k	Kill line
< 1 + 4 digits	Line length
< m + 1 digit	Mortice (kern)
< n	Normal mode
< o + 1 character	Load stored codes
< p + 2 digits	Point size
< q	Quad right
< r + 2 digits	Begin runaround
< s + 2 digits	Store format
< t + 1 digit	Typeface (style)
< u	Allow flash
< v + 3 digits	Leading
< w + 2 digits	Store leader width
< x	Cancel indenting
< y + 1 character	Supershift
< z	Tabulation
< 0	Zero width
< 1	1 unit space
< 2 + 4 digits	Indent left
< 3	Indent text
< 4 + 4 digits	Indent right
< 5	Force justification
< 6 +4 digits	Indent both
< . (period)	Cancel flash
< TF (Tapefeed)	Stop
< SB (Spaceband)	Change set width
< , (comma)	Divide leader space
< - (hyphen)	Zero lead
(none needed)	Centered accent

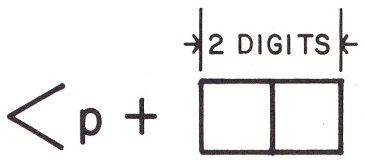


— Figure 2-5 Adding 10 Points of Lead —

2.3 MAIN FUNCTION CODES

There are five main function codes required for operation of the Pacesetter. These codes are: point size, line length, typeface, leading, and mode.

2.3.1 Point Size - The point size range is 5 to 72 point in 16 separate size changes. In addition, a maximum of 15 changes are allowed within a line or tab column. The following function code is required to access one of sixteen lenses:

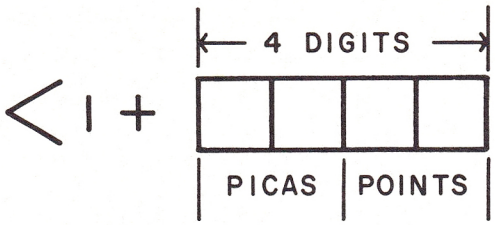


To assure proper spacing between two different point sizes insert a space band before going to a larger size and after going to a smaller size. Manual selection of a point size can be obtained by placing the MAN/AUTO LENS switch on the right hand control panel to the MAN position and selecting the desired lens by turret position with the LENS POSITION thumbwheel switch. Manual operation will override any point size information on tape.

2.3.2 Line Length - Accommodations are made for line lengths up to 45 picas when using a lens size from 8 to 72 point. Minimum line length is one point. Maximum line lengths below 8 point are as follows:

5 POINT — 28 PICAS
6 POINT — 33 PICAS
7 POINT — 39 PICAS

The following function code is needed to obtain the required line length:

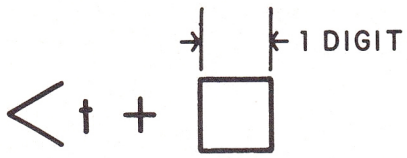


The two left hand digits represent picas and the right hand digits represent points. Therefore, they must be added for total line length.

You cannot change the line length value once the operation for that line has begun and the code must be followed by quad left and carriage return.

Manual selection of line length can be obtained by placing the MAN/AUTO LINE switch on the right hand control panel to the MAN position and selecting the desired line length in picas and points with the LINE LENGTH thumbwheel switches. Manual operation will override any line length information on tape.

2.3.3 Typeface - A maximum of eight different typefaces may be accessed by using the following function code:

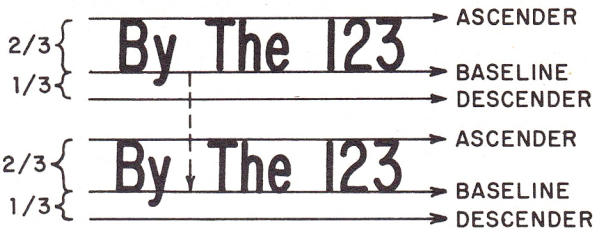


One of two ways to change a typeface is by referring to the "C" sheet supplied with machine's disc for typeface desired and insert its number (1-8) into the above function code. You can change the typeface anywhere in a line and as many times as necessary to complete a job. A second means of changing a typeface is by utilizing the UPPER ROW, LOWER ROW, UPPER MATRIX, and LOWER MATRIX keys on the keyboard. On some keyboards UPPER ROW is represented by UPPER RAIL, LOWER ROW by LOWER RAIL, UPPER MATRIX by QUAD RIGHT, and LOWER MATRIX by PAPER FEED.

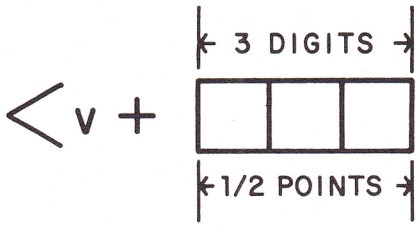
Referring to the chart below, if you are in typeface one press and release of the UPPER ROW key will change operation to typeface two. Consequently, if you are in typeface two and the LOWER ROW key is pressed and released, operation will change back to typeface 1.

LOWER ROW	UPPER ROW	LOWER MATRIX	UPPER MATRIX
1	2	1	3
3	4	2	4
5	6	5	7
7	8	6	8

2.3.4 Leading - Vertical spacing or leading is the amount of space between the baselines of two lines of type as shown in the following example:



The following function code is needed to obtain the required amount of leading:



Note that the three digits are in half points. When you calculate the amount of leading in points desired be sure to double it before inserting into machine. The maximum amount of leading that can be inserted between two type lines is 255 half points or 127.5 points. Also, this code must be followed by a quad left and carriage return when in hyphenation mode.

In the example given, notice that the spacing between the ascender and baseline is 2/3 of the total point size and the spacing between the baseline and decender is 1/3 the total point size. To calculate the minimum amount of space or leading required between two type lines take 1/3 of the present point size you are using and add it to 2/3 of the point size you wish to use.

The following are examples of leading calculations:

1. Coming from 12 point and going to 12 point

1/3 of 12 Point	=	4 Point
2/3 of 12 Point	=	8 Point
		12 Point

= Minimum Required Leading

2. Coming from 18 point and going to 36 point

1/3 of 18 Point	=	6 Point
2/3 of 36 Point	=	24 Point
		30 Point

= Minimum Required Leading

To further assist in determining the minimum amount of leading required refer to the following chart.

QUICK LEADING CHART

POINT SIZE (FROM) →	5	6	7	8	9	10	11	12	14	18	24	30	36	42	48	54	60	72
1/3 POINT SIZE	2	2	3	3	3	3	4	4	5	6	8	10	12	14	16	18	20	24
PLUS																		
POINT SIZE (TO) →	5	6	7	8	9	10	11	12	14	18	24	30	36	42	48	54	60	72
2/3 POINT SIZE	3	4	4	5	6	7	7	8	9	12	16	20	24	28	32	36	40	48

Quick Formula for Leading

1/3 of point size from +2/3 of point size to = total leading amount

3. Coming from 36 point and going to 18 point

1/3 of 36 Point	=	12 Point
2/3 of 18 Point	=	12 Point
		24 Point

= Minimum Required Leading

Manual selection of leading can be obtained by placing the MAN/AUTO LEAD switch on the right hand control panel to the MAN position and selecting the desired amount of leading with the LEADING thumbwheel switches. These switches indicate half-points for 5 point to 30 point lenses and full points for 36 to 72 point lenses. Manual operation will override any leading information on tape.

2.3.5 MODES - The Pacesetter has the capability of operating in two modes; hyphenation or normal/tab. Hyphenation mode allows the operator to perforate "endless" or "idiot" tape which contain all typographic functions (typeface, point size, etc.) with no end-of-line decisions [this ability was stored in memory as rules when the main program tape was processed.] The main program also contains a 30 word prefix dictionary. Hyphenation can be selected by setting the HYPH/NORM switch on the left hand control panel to the HYPH position or using the following function code:

<h

Discretionary hyphenation is also a part of the main program. It allows the operator to select the proper location for inserting a hyphen between letters in a word. Three means of inserting discretionary hyphens at a desired word break are: HYPHEN-HYPHEN, HYPHEN-TAPE FEED, and HYPHEN-CARRIAGE RETURN. The program will automatically insert a hyphen in this position, provided there is a good line ending point. If the hyphen is not needed it will be dropped out when the word is exposed. All Pacesetter functions may be used except tabulation.

Normal/tab mode will not accept "idiot" tape. Therefore all information entered in this mode must be counted for good justification. This mode, which accesses the normal/tab portion of the program, can be selected by setting the HYPH/NORM switch on the left hand control panel to the NORM position or using the following function code:

<n

Regardless of which position the HYPH/NORM switch is in, the tape reader input parameter (hyphenation or normal/tab)will always take precedence. When the RESET switch is pressed and released program operation will revert back to the HYPH/NORM switch input.

2.4 KILL CODES

The Pacesetter program provides three different ways to delete characters or frames of information from the input tape or the memory buffer.

2.4.1 Kill Line - This function is utilized in conjunction with the machine's normal or hyphenation mode. The function code for kill line is as follows: <k

In the normal mode (HYPH/NORM switch in NORM position) when inserted into line will delete all information from the buffer up to the last carriage return code. When in hyphenation mode at a certain line point, this function code

will perform a kill word function by deleting everything up to but not including the last space band.

2.4.2 Forget Word - This function, when used in either HYPH or NORM modes, will delete the last word that was typed on the TTS tape. This command is stopped from deleting by the presence of a carriage return, inter-word space (space band), hyphen or discretionary hyphen. The function also takes out any commands that are present between the entry of the function code and the three possible termination points. The function code of forget word is as follows:

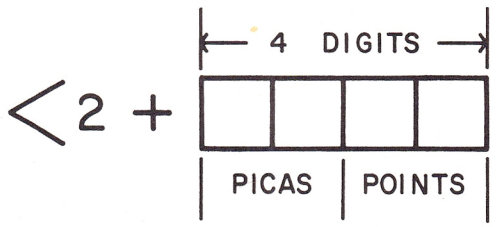
<f

2.4.3 Rubout - A rubout (all channels in one tape frame perforated) is used when you wish to delete unwanted text information of numeric values of a function code. For example, while entering 12 point size information onto tape you press key 3 instead of key 2. You can press the BACKSPACE key which will backspace the keyboard and then press RUBOUT over the 3 code. You can then press key 2 and continue with your keyboarding. If a mistake is made entering the function code you must rubout the entire function code, including the bell code, and re-enter the correct function code.

2.5 INDENTING

There are four ways an operator can indent the copy; indent left, indent right, indent both, and indent text. The maximum of all indents may not exceed 255 points.

2.5.1 Indent Left - The following function code indicates the amount of space to be indented from the left hand margin:



The amount of indent used can not exceed 21 picas and 3 points or 255 points. It will take place immediately, unless a runaround is in effect. If this code is controlled by a runaround, the runaround should be placed before the code.

This function code can be stored and called for from formats and can be used simultaneously with an indent right function code.

The indent left code parameter can be cancelled by a Cancel indent or End-Runaround function code as shown on Figure 2-6.

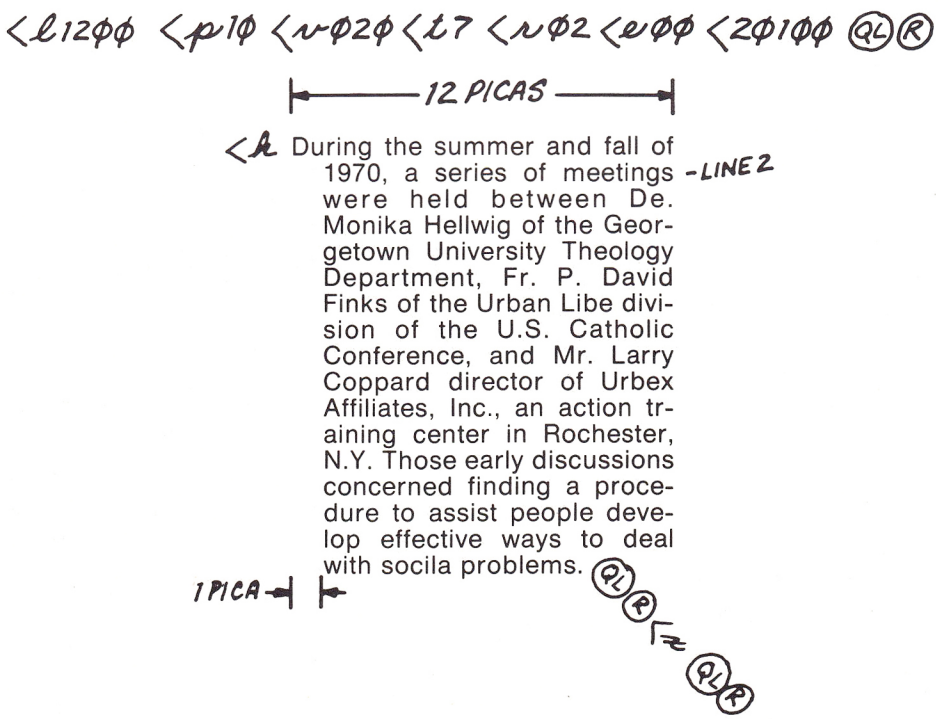
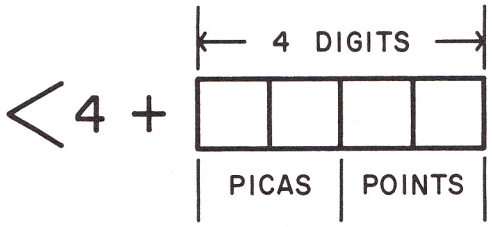

<ℓ12φφ <p1φ <ν φ2φ <ℓ7 <ν φ2 <ℓ φφ <2φ1φφ QL R
12 PICAS
<ℓ During the summer and fall of 1970, a series of meetings -LINE 2 were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. QL R
1 PICA
QL R

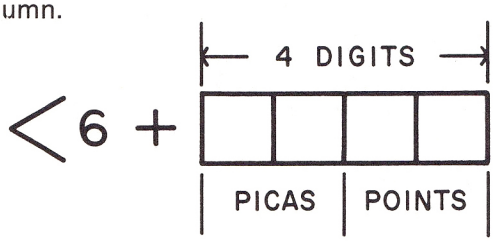
Figure 2-6 Example of Indent Left

2.5.2 Indent Right - The indent right function code indicates the amount of space to be subtracted from the right hand margin. Aside from this difference the other specifications are identical to those explained for the indent left code.

The function code for indent right is as follows:



2.5.3 Indent Both - The function code shown below indicates the amount of space to be equally subtracted from both sides of the column.



Maximum amount of indent when using this code is 10 picas and 7 points from each side. In addition, it can be cancelled by a Cancel Indent or End-Runaround code.

2.5.4 Indent Text - To place an indent in a line insert the following function code at desired position.

Point size mixing cannot be accomplished while this code is in effect and it must be preceded with fixed widths only, no spacebands.

Figure 2-7 is an example of indent text.

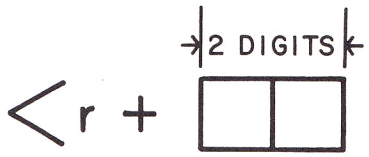
2.5.5 Cancel Indents - To cancel all indents currently in use, insert the following function code shown below and follow it with a carriage return.

2.6 RUNAROUNDS

Runaround is that section of a column which has been indented from left, right or both sides. This is done so that art work or photographs can become part of that column. For example, a sportswriter's picture becomes a part of his daily column.

2.6.1 Begin Runaround - This function code indicates how many lines down in a column the indent value shall be inserted, up to a maximum of 63.

The begin runaround function code is as follows:

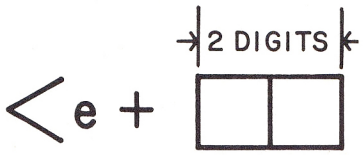


Always follow this code with end runaround, indent, quad left, and carriage return in that order.

Only one runaround can be in effect at one time and may be stored in formats for repeated entry.

2.6.2 End Runaround - This function code allows you to insert the line number you wish to stop the runaround and return to full measure [up to a maximum of 99].

The following is the end runaround function code:



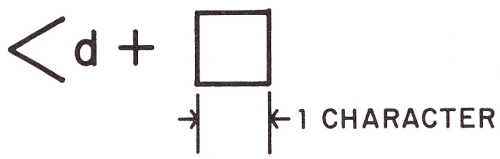
If you do not want the indent to stop (hanging indent situation as shown in Figure 2-6) insert two zeros into the digits portion of your code.

Figure 2-8, 2-9, and 2-10 are examples of the various runarounds.

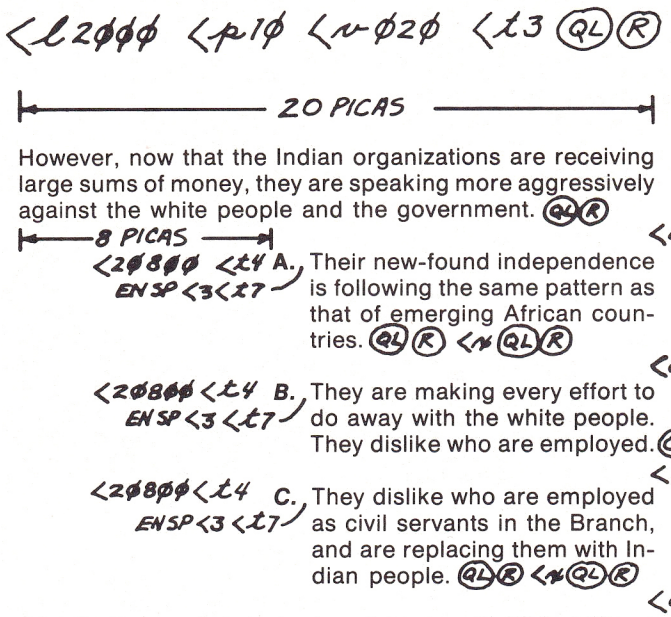
2.7 LEADERS

A leader is defined as any one of the 112 flashable characters on the disc or any of the fixed widths. It cannot be defined as a function or a spaceband.

2.7.1 Define Leader - The function code for define leader is as follows:



When using upper case or super case characters place the case code before the define leader code and unshift after character. The selected leader can be stored and called from formats and tab columns. This allows you the capability of having a different leader character in each column for a given tab job.



However, now that the Indian organizations are receiving large sums of money, they are speaking more aggressively against the white people and the government. QL R

A. Their new-found independence is following the same pattern as that of emerging African countries. QL R <v QL R

B. They are making every effort to do away with the white people. They dislike who are employed. QL R <v QL R

C. They dislike who are employed as civil servants in the Branch, and are replacing them with Indian people. QL R <v QL R

And first-class tickets to travel back and forth with no regard to the expenses which may be incurred. Although many leaders threaten the federal government bu waving verbal tomahawks over their heads in an apparent struggle for better treatment for the Indian, they are in fact exploiting their own people. QL R

However, now that the Indian organizations are receiving large sums of money, they are speaking more aggressively against the white people and the government.

A. Their new-found independence is following the same pattern as that of emerging African countries.

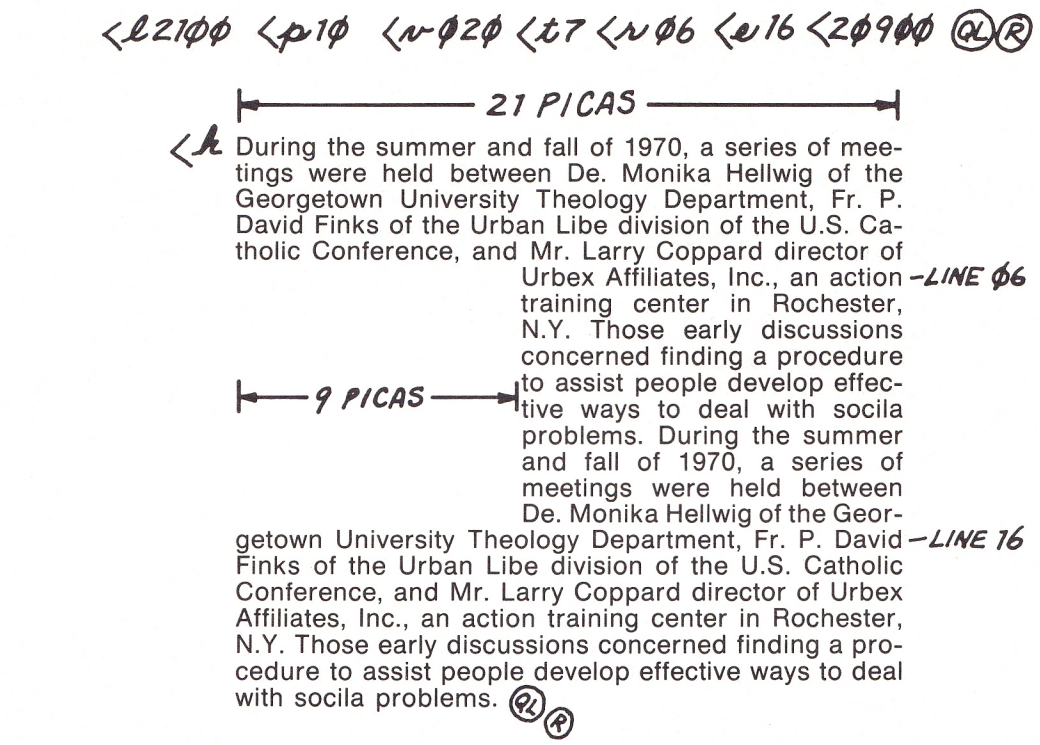
B. They are making every effort to do away with the white people. They dislike who are employed.

C. They dislike who are employed as civil servants in the Branch, and are replacing them with Indian people.

THIS WILL OCCUR IF <v IS NOT USED AFTER QL R AND BEFORE <2

And first-class tickets to travel back and forth with no regard to the expenses which may be incurred. Although many leaders threaten the federal government by waving verbal tomahawks over their heads in an apparent struggle for better treatment for the Indian, they are in fact exploiting their own people.

Figure 2-7 Example of Indent Text


<ℓ21ϕϕ <p1ϕ <nϕ2ϕ <t7 <nϕ6 <e16 <2ϕ9ϕϕ QL R
21 PICAS
<h During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. QL R
LINE ϕ6
9 PICAS
LINE 16

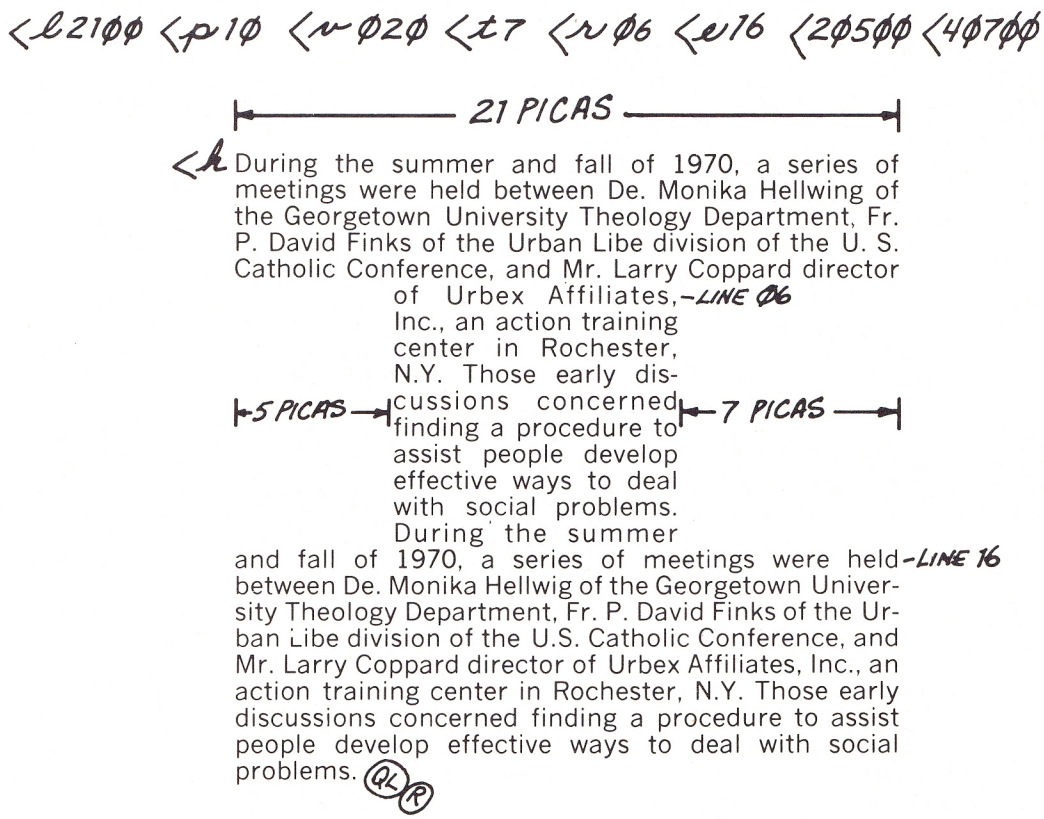

<ℓ21ϕϕ <p1ϕ <nϕ2ϕ <t7 <nϕ6 <e16 <2ϕ5ϕϕ <4ϕ7ϕϕ QL R
21 PICAS
<h During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwing of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U. S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with social problems. During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with social problems. QL R
LINE ϕ6
5 PICAS
7 PICAS
LINE 16

Figure 2-8 Runaround Left and Runaround Left and Right

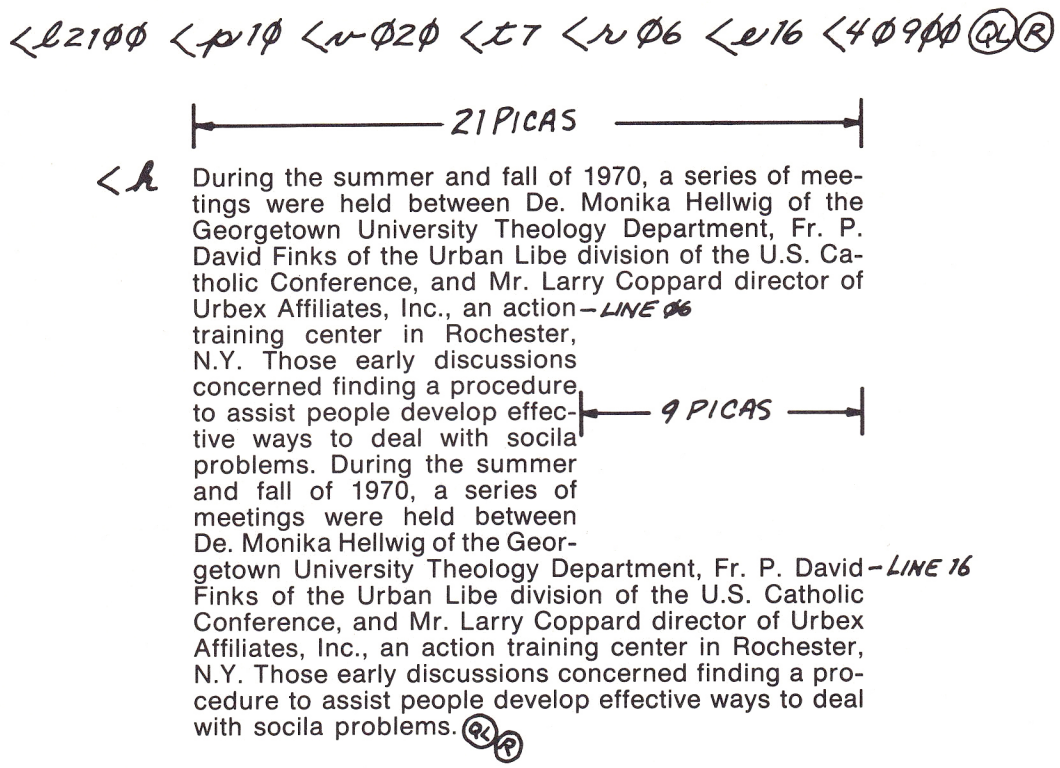

<l21ϕϕ <p1ϕ <v-ϕ2ϕ <t7 <rϕ6 <e16 <4ϕ9ϕϕ QL R
21 PICAS
<h
During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action
LINE ϕ6
training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effec-
9 PICAS
tive ways to deal with socila problems. During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David
LINE 16
Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. QL R

Figure 2-9 Runaround Right

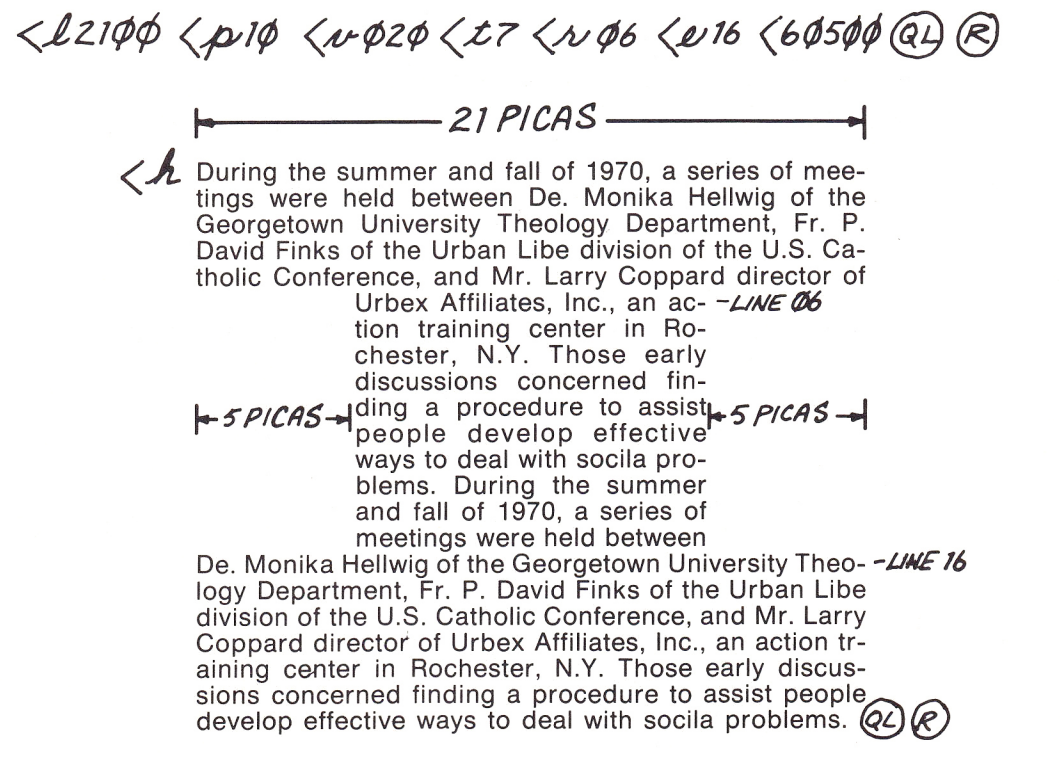
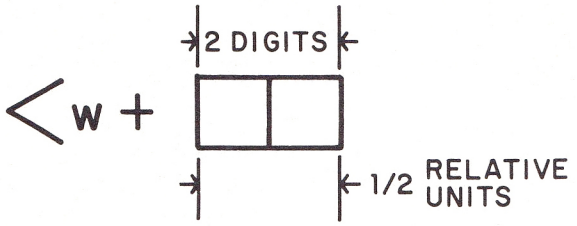

<l21ϕϕ <p1ϕ <v-ϕ2ϕ <t7 <rϕ6 <e16 <6ϕ5ϕϕ QL R
21 PICAS
<h
During the summer and fall of 1970, a series of meetings were held between De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of
LINE ϕ6
Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. During the summer and fall of 1970, a series of meetings were held between
5 PICAS
5 PICAS
De. Monika Hellwig of the Georgetown University Theology Department, Fr. P. David Finks of the Urban Libe division of the U.S. Catholic Conference, and Mr. Larry Coppard director of Urbex Affiliates, Inc., an action training center in Rochester, N.Y. Those early discussions concerned finding a procedure to assist people develop effective ways to deal with socila problems. QL R
LINE 16

Figure 2-10 Runaround Both

2.7.2 Define Leader Width - The following function code will insert relative half units (RHU in one point equals .000386 inches square) between the leading edge of one character to the leading edge of the next character.



This code can be stored in a tab column or format and will remain in effect until it is changed.

2.7.3 Insert Leader - The insert leader function code is shown below.

< i

The number of leaders inserted depends on the width of the leader and the code can be used once or twice in any line. If it is used only once, point size mixing is allowed. When used twice in a line point size mixing is not allowed and the text between the leaders is automatically centered on that line.

To assure that the text is always centered use fixed width in place of space bands. The insert leader code recognizes the next carriage return as an end of line code. Thus, you should not have a quad code in the same line. Figure 2-11 is an example of insert leaders.

2.7.4 Divide Leader Space - The function code shown below is the divide leader space function code.

You may use this code more than once in a line. When used twice in a line the text between the two divide leader space codes will not be centered on that line but will be centered between left hand copy and the right hand copy.

This code can be used with point size mixing, making it very useful for setting grocery ads as shown on Figure 2-12.

2.8 DEFINE VERTICAL RULE

This function is used to define a flashable character or a fixed width that will be flashed at the beginning of each line or tab column. The function takes affect upon the first quad left carriage return that appears and remains in effect until the operator re-defines the character as a rubout or tapefeed. When using upper case or super case characters, place the

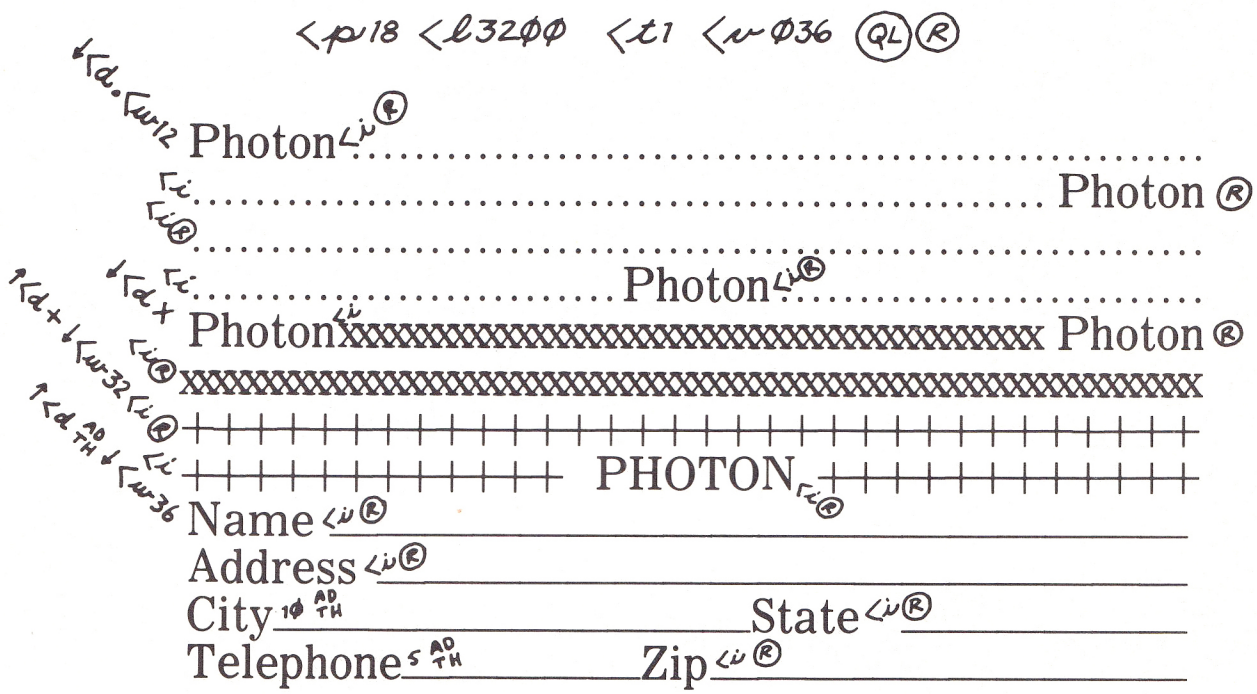


Figure 2-11 Insert Leaders

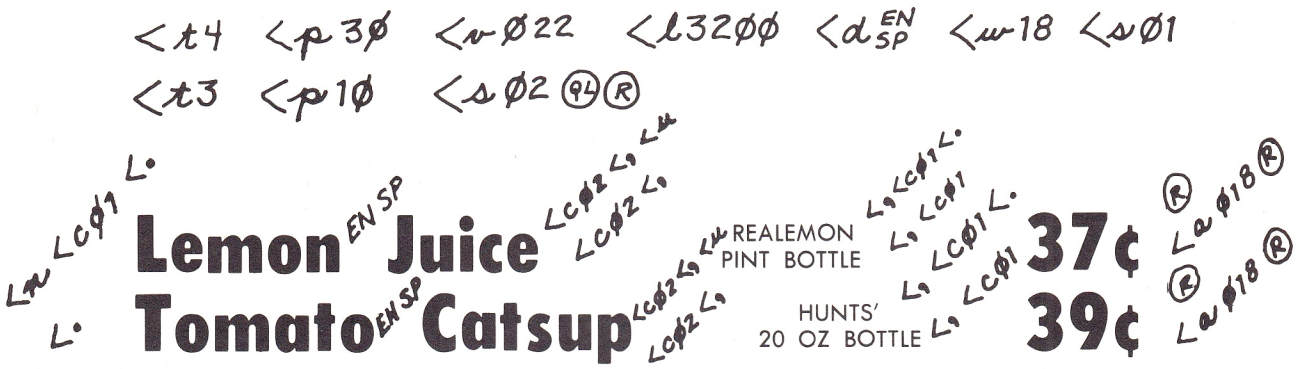


Figure 2-12 Divide Leader

Shop only once a week with this extra-big, 16 cu. ft.
Frostless Coldspot Refrigerator
329.95
Completely Frostless. Never needs defrosting
3-temperature butter conditioner
137-lb. capacity freezer with true zero-zone freezing
Odor-free porcelain interior
Adjustable shelves, meat keeper and twin
Handy molded egg rack. Door shelves
Separate temperature controls
Long-life rotary compressor
Color-trimmed interior
Beautiful 'sculptured' Woodgrain handles
13.7 cu. ft. Frostless Coldspot with 105-lb. freezer capacity

Figure 2-13 Define Vertical Rule

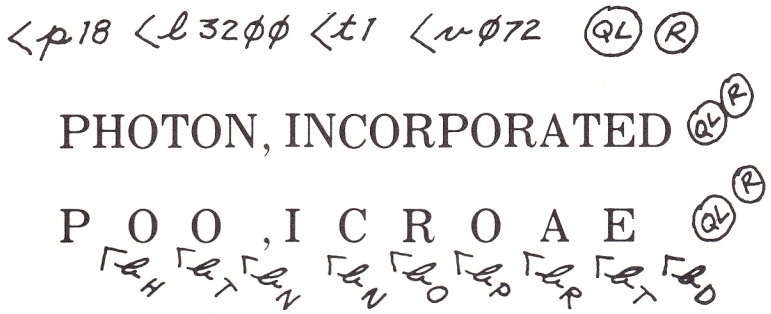
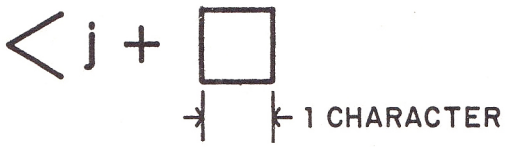


Figure 2-14 No Flash (next character)

case code before the define vertical rule code (see Fig. 2-13). The function code is as follows:



2.9 FLASH/NO FLASH

The program provides three function codes which allow you to flash a character of characters, cancel flash of a single character, and cancel flash of more than one character.

2.9.1 No Flash Next Character - If you wish to blank out a particular character place the following function code before that character:

Flashing operations will automatically resume after the selected character was not flashed, leaving a blank space (width of character) on that line as shown on Figure 2-14.

2.9.2 Cancel Flash - The following function code will inhibit the flashing of all subsequent characters on a line, from where it is inserted.

This code may be used in either the normal or hyphenation mode and is terminated when a line ending code such as quad left/carriage return in the hyphenation mode or a carriage return in the normal mode is inserted. It can also be terminated by an allow flash function code.

2.9.3 Allow Flash - The function code shown below will allow all characters which follow it to be exposed on the photographic material.

A quad left/carriage return code in the hyphenation mode or carriage return code in the normal mode may be used in place of the allow flash code.

2.10 LINE JUSTIFICATION

With proper use of function codes and by referencing Table 2-2, the user is provided with a good deal of line justification flexibility.

Table 2-2 Justification Values

727 MK-1

DESCRIPTION	LOCATION	DATA
Minimum Space Band (Hyph & Norm Mode)	0454	3008
Maximum Space Band (Normal Mode)	0576	3040
Maximum Space Band (Hyph Mode)	0565	3010
Maximum Letter Space	00FD	3006
Quad Expansion (Negative Value)*	0119	5FFA
Quad Expansion (Positive Value)*	011C	3006

730 MK-2

DESCRIPTION	LOCATION	DATA
Minimum Space Band (Hyph & Norm Mode)	0468	3008
Maximum Space Band	00E1	3010
Maximum Letter Space	00F5	3006
Quad Expansion (Negative Value)*	0110	5FFA
Quad Expansion (Positive Value)*	0113	3006

*When you change the value in location 119 you must also insert its complement into loacation 11C, and vice-versa (006 is the complement of FFA). Location 110 and 113 in 730 MK-2.

The values shown in the table were initially loaded into the machine when the main program tape was processed. They represent what Photon, Inc. considers standard justification parameters.

Once a line has been established (automatically in hyphenation mode or carriage return in normal mode) it is put through a justification routine. Extra white space in the program is taken up by either word expansion in the normal mode or word and letter expansion in the hyphenation mode. By changing the stored word or letter values you can change the setting of the copy. If you change a value in Table 2-2 remember to enter it in half-relative units. Also, for quadded lines a space band expansion is allowed up to the maximum value stored in the program.

2.10.1 Quad Left - If a line contains a quad left code the right side of that line will be set with white space. Space bands will be expanded up to the maximum expansion. Changing this value will allow you to change the size of the quadded line.

Business Management ®
or ®
Business Economics Management ®
B. S. Degree ®®

First Year ®

First Semester ®©		Second Semester ©®®	
3-100	Bus. Admin. Orient.	3-241	Mnagerail material	3 ®
3-121	Typewriting	9-102	Composition Accounting	3 ®
9-240	MANAG Account.	1-107	Social Science	3 ®
4-140	COLLEGE Algebra	1-131	Intro to Statistics	4 ®
CC-5	Laboratory Science	CC-5	Physical Ed.	5 ®
		2 ADD TH		
		15		15

Second Year ®

4-123	Prin. of Economics	4-232	Prin. of Economics II	3 ®
4-235	Mathematics of Finance	4-336	Business Statistics	3 ®
8-101	Physical Education	1-803	Physical Education	5 ®
CC-2	HUMANITIES	CC-34	HUMANITIES Elective	3 ®
CC-4	Social Sciences Elective	CC-3	Social SCIENCES	3 ®
CC-4	General Elective	CC-2	General Elective	5 ®
		16		
		2 ADD TH		

Figure 2-15 Tab No. 1

Dynaglass Tubeless Wide Guard Tires	Sale Price Blackwall	Sale Price Whitewall	Plus Federal Excise Tax
C78-13 or 650x13	$24.07	$27.27	$1.90 ®
D78-14 or 695x14	$25.29	$28.46	$2.37 ®
E78-14 or 735x14	$26.58	$29.71	$2.34 ®
F78-14 or 775x14	$28.30	$31.61	$2.52 ®
G78-14 or 825x14	$30.74	$33.71	$2.69 ®
H78-14 or 855x14		$36.41	$2.93 ®
J78-14 or 885x14		$38.85	$3.04 ®

Built with two fiber glass belts PLUS two nylon cords plies! The fiber glass belts beneath the tread help reduce tire squirm and wiggle. . . you get outstanding traction and long mileage. Nylon cord plies for strength and dependable performance. ®

Figure 2-16 Tab No. 2

2.10.2 Quad Right - Using the function code shown below, the copy will be set with white space at the left.

2.10.3. Quad Center - With a quad center code in a line the copy will be set with equal white space on the left and right sides. Space bands will be expanded up to the maximum quad expansion. Change the value to change size of quadded lines.

2.10.4 Quad Lock - Many situations call for every line to be set with a particular type of quadding. To get this effect, insert two codes (quad left-quad left, quad center-quad center, or bell+q-bell+q). If quad lock is run in the hyphenation mode it will be more effective if the quad expansion is reduced to zero. To accomplish this insert 5000 and 3000 into locations 119 and 11C, respectively. (Location 110 and 113 in MK-2.)

2.10.5 Force Carriage Return - In the hyphenation mode, the force carriage return function code shown below will cause the correction line to be justified at the next carriage return.

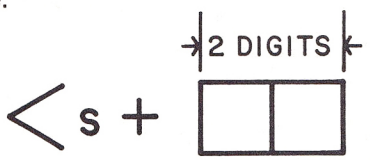
2.11 TAB/FORMATS

Each tab column is represented in memory by a block of six words. The program allows for a maximum of 40 tab columns, which means there are 40 blocks of 6 words each or 240 words. The following alterable functions, which were initially stored in memory when the main program tape was processed, are automatically called in from the tab block:

Function	Value
Line Length	20 picas
Size	9 point
Style	1
Leading	18 half points
Leader Character	period
Leader Width	18 half units
Quad Code	0 for justification
Rule Character	ignore

When the user accesses a tab column, he calls out all the information stored in the respective tab block. The following function code will call out the 40 blocks sequentially each time it appears:

An example of this code is shown on Figure 2-15. The program also allows a maximum of 40 formats which occupy the same memory locations as the tab block but in reverse order (tab column 1 equals format 39, tab column 2 equals format 38, etc.). To alter or replace the values in a particular tab column define your changes using desired function codes (size, style, etc.) and follow it with the following function code:



The two digits must be represented by a number from 39 to 00 (39 alters column 1, 38 alters column 2, etc.). The following is an example of the above function codes:

Bell p09 Bell v018 Bell t1 Bell l0800 Bell d. Bell s39 Bell t 2 Bell l0600 Bell d en sp QC QC Bell s 38

	COLUMN 1 Format 39	COLUMN 2 Format 38
Line Length	8 picas	6 picas
Size	9 point*	9 point*
Style	1*	2
Leading	18* (½ pts.)	18* (½ pts.)
Leader Character	period*	EN space
Leader Width	18* (½ R.U.)	18* (½ R.U.)
Quad	not used	not used
Rule	not used	not used

*Value stored when main program tape was processed.

To call the above values from storage, insert a bell z function code twice (first code produces format 39, the second code format 38).

The rule character will be set in the size and style of the previous tab column. Therefore, when using style or size mixing between columns you should not use a rule character. You can also change a value within the tab column by inserting its function code and change after the bell z function code for the particular column

Normal indents cannot be set up in individual tab columns, although an indent may be set up to affect all of the columns. An indent for a particular column can be generated by defining the rule character as a fixed width. This gives the user a choice of 4 indents to use in a tab column. In addition, by defining up to 4 more

REVOLVING INDEX

Issue	Keyword(s)	Title	Author
January 1971	Statistics	Statistical Quality Control is Vital for Today's Graphic Arts Industry	Albert D. Rickmers
January 1971	Die Cutting	Die Cutting for Graphic Arts	William Billings
February 1971	Facsimile Transmission	Facsimile Transmission: A Newspaper's Tool	Kathleen Spangler
February 1971	Graphic Arts Association	The National Printing Equipment Association	Lee Augustine
March 1971	Statistics	Statistical Quality Control:	Albert D. Rickmers
March 1971	Electronic Scanners	Electronic Scanners: Present Performance and Future Potenial	Kathleen Spangler
March 1971	Graphic Arts Association	Technical Association of the Graphic Arts	Anonymous
March 1971	3-D	A Look at 3-D	Kathleen Spangler
April 1971	Marketing	The Philosophy of Marketing in Graphic Arts	Kathleen Spangler
April 1971	Graphic Arts Association	Graphic Marketing Information Service	Henry A. Paulsen
April 1971	Humidity	Humidity in Graphic Arts	William C. Billings
May 1971	Screen Printing	A New Image for Screen Printing	Kathleen Spangler
May 1971	Driography	Driography: A Step Toward Simplicity in Printing	Kathleen Spangler
May 1971	Graphic Arts Association	Screen Printing Association	John M. Crawford
June 1971	Typography	New Technologies Challenge Classical Typography	Kathleen Spangler
June 1971	Metal Typography	There is Still a Place for Metal Typography	Eli Cantor
June 1971	Graphic Arts Association	Internation Association of Rearch Institutes for the Graphic Arts Industry	Anonymous
June 1971	Metrication	Think Metric	Kathleen Spangler Selah Bond, Jr.

Figure 2-17 Tab With Inserts

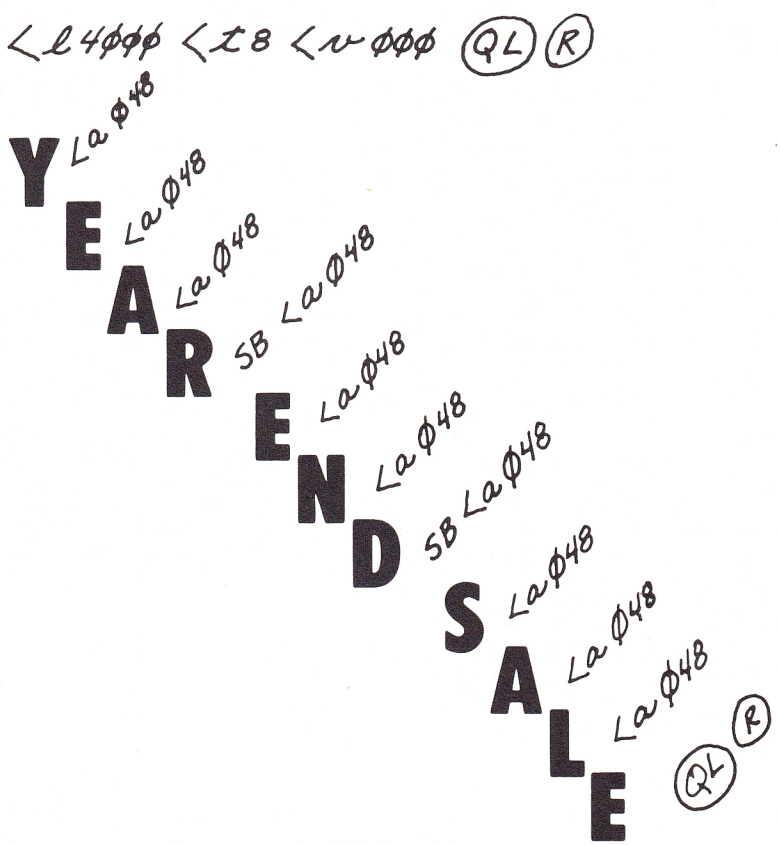


Figure 2-18 Add Lead

fixed widths, (as status table values 74, 75, 76, 77) the user could get other indents.

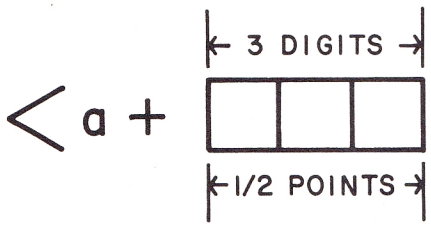
Figures 2-15, 2-16, and 2-17 are examples of storing formats and calling for tab column formats.

2.12 ADDING LEAD

There are two ways to add lead or additional vertical space to your copy. One way is to use carriage return while in the normal mode and the other is to use the add lead function code.

2.12.1 Carriage Return - With the insertion of a carriage return, while in the normal mode, and amount of leading equal to the stored value will be added. For example, if the stored value is 10 points the presence of a carriage return will produce an extra 10 points. In hyphenation mode a carriage return is treated as a space band.

2.12.2 Add Lead Code - The function code shown below will add half points of leading at the point it is inserted.



In the normal mode it can be placed between characters for a stair stepping effect as shown in Figure 2-18.

2.13 ZERO LEADING

There are two function codes which provide temporary or permanent zero leading capability.

2.13.1 Temporary - The function code, which will inhibit the stored leading value for one line only, is as follows:

< - (HYPHEN)

This code must be placed after a quad function and carriage return for the line you want to inhibit leading. For example, if you wish to inhibit leading on the second line then at the end of the second line you would insert; quad (left, right, or center), carriage return and bell hyphen. This function code can only be used when the MAN/AUTO LEAD switch on the right hand control panel is in the AUTO LEAD position.

2.13.2 Permanent - To obtain permanent leading insert the following function code, including the three zero digits:

< v + 000

In the hyphenation mode this function code must have a quad function and carriage return after it.

To restore leading operations replace the three zeros with a specified amount in half points and follow it with a quad left and carriage return function.

4.14 ZERO WIDTH

To set characters with zero width use the following function code:

< 0 (ZERO)

Inserting this code before the character you wish to zero width allows you to flash one character over the other. An example of zero width is shown on Figure 2-19.

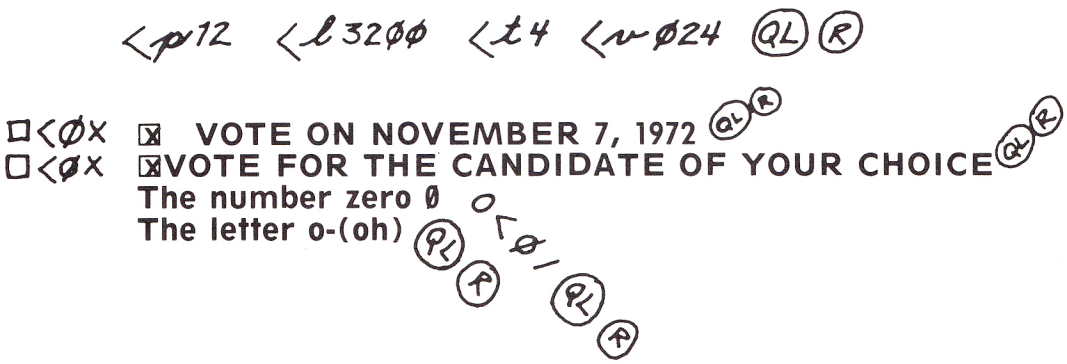

<p12 <ℓ32ØØ <t4 <v Ø24 QL R
□<ØX ☒ VOTE ON NOVEMBER 7, 1972 QL R
□<øX ☒VOTE FOR THE CANDIDATE OF YOUR CHOICE QL R
The number zero Ø
The letter o-(oh)
QL R QL R

Figure 2-19 Zero Width

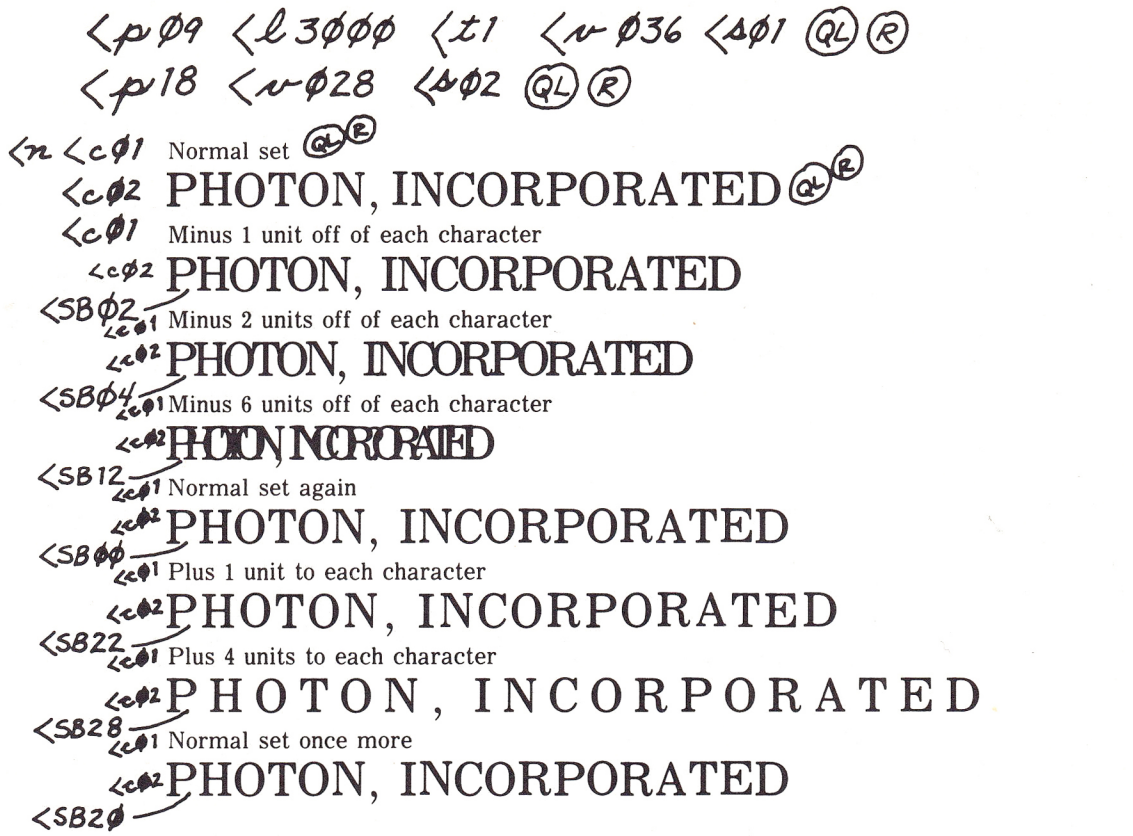

<p Ø9 <l 3ØØØ <t1 <v Ø36 <sØ1 QL R
<p 18 <v Ø28 <sØ2 QL R
<n <cØ1 Normal set QL R
<cØ2 PHOTON, INCORPORATED QL R
<cØ1 Minus 1 unit off of each character
<cØ2 PHOTON, INCORPORATED
<SBØ2 <cØ1 Minus 2 units off of each character
<cØ2 PHOTON, INCORPORATED
<SBØ4 <cØ1 Minus 6 units off of each character
<cØ2 PHOTON, INCORPORATED
<SB12 <cØ1 Normal set again
<cØ2 PHOTON, INCORPORATED
<SBØØ <cØ1 Plus 1 unit to each character
<cØ2 PHOTON, INCORPORATED
<SB22 <cØ1 Plus 4 units to each character
<cØ2 PHOTON, INCORPORATED
<SB28 <cØ1 Normal set once more
<cØ2 PHOTON, INCORPORATED
<SB2Ø

Figure 2-20 Change Set Width

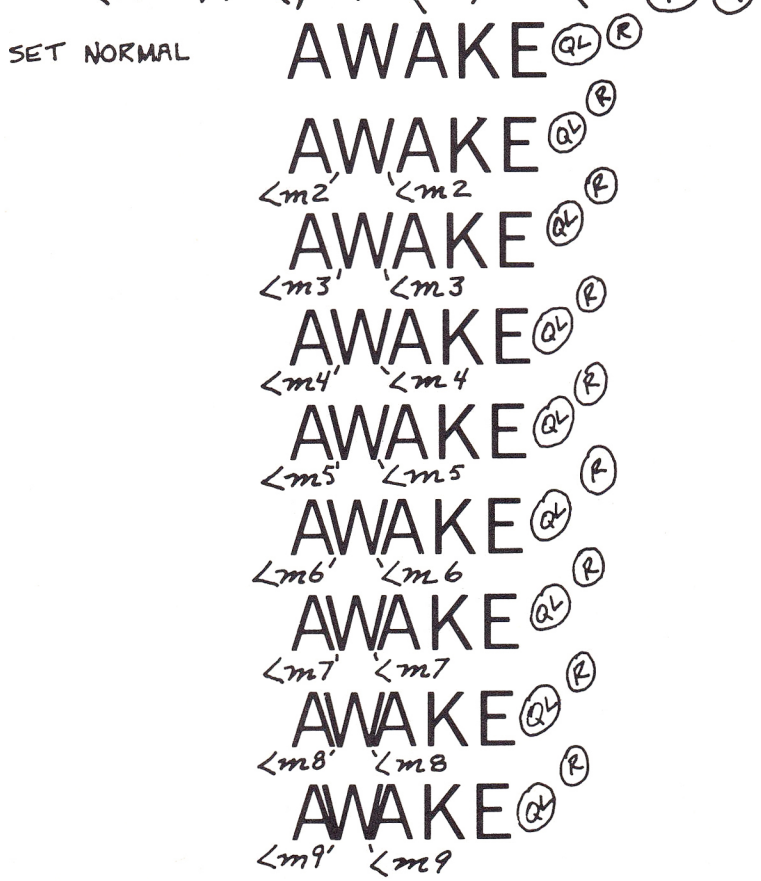


Figure 2-21 Mortice (Kern)

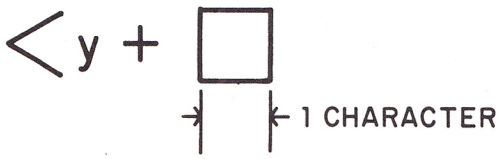
2.15 CASE CODES

There are three different case codes used to access the characters listed on your "C" sheet; unshift, shift, and supershift. All of these codes can be stored in a format.

2.15.1 Unshift - Press and release of the UNSHIFT key allows you to access the first group of 48 characters shown on your "C" sheet. All of these characters are in lower case.

2.15.2 Shift - To access upper case characters, press and release the SHIFT key. They are the second group of 48 characters shown on your "C" sheet.

2.15.3 Supershift - The following function code allows you to access the last 16 supershift characters listed on your "C" sheet:



The following characters are used to access the 16 supercase characters Bell + y + 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, $, -, e, t, a in the 727 MK-1 and 730 (Lo-Speed Mode) MK-2 Pacesetters.

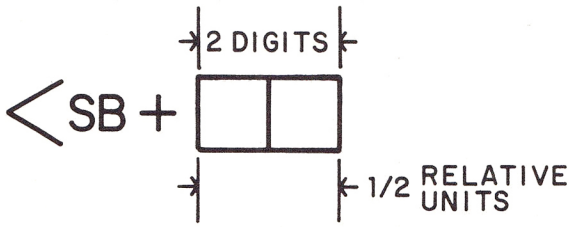
The following characters are used to access the 16 supercase characters - Bell + y + 0, 1, 2, 3, 4, 5, 6, 7, e, t, a, i, n, s, o, r in the 730 MK-2 HI-Speed mode. [To make supercase equivalents for the two modes (Hi-Speed configuration only) change address 0368 to A5B6.]

The code will remain in effect until it is changed by a shift or unshift operation.

2.16 WHITE SPACE CHANGES

Three ways to change white space between characters are: change set function code, mortics (kern) function code, or using the white space reduction table. Instructions on making and using this table can be found in Paragraph 2.27.

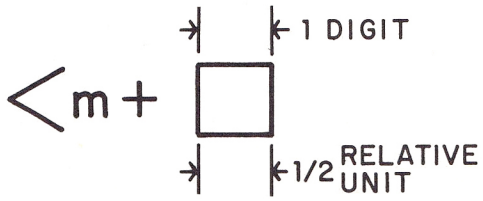
2.16.1 Change Set - The function code shown below will add to or subtract from each character width, the designated number.



A value between 01 and 19 will subtract ½ Relative Unit to 9½ Relative Units. A value between 20 and 39 will ADD ½ Relative Unit to 9½ Relative Units. This new value will remain in effect until you insert a point size change, a typeface change, or a new change set code.

Changing the point size or typeface will put any change back to zero. Figure 2-20 is an example of change set.

2.16.2 Mortice (Kern) - To reduce the escapement of the next character to be flashed, use the following function code:

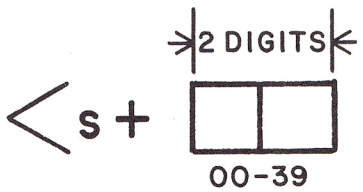


The one digit is the number of half units to be subtracted from the next character only. An example of the mortice function code is shown on Figure 2-21.

2.17 FORMATS

The program contains a block of 6 words that is called the active use area, for internal machine processing. Each format occupies a similar block within memory with the same function codes in their respective positions. Thus, the storing and calling of formats can be achieved by moving the active use area block into the desired format block or vice versa.

Function codes are initially stored in the active use area when the program is set up. Any future changes to the use area will be incorporated into the format block when it is stored away. The function code is as follows:



The format will remain stored in the machine until it is reprogrammed or a new format is entered utilizing the same number. There are 40 formats available starting with the number 00 through 39. This number lessens by one for every tab column used starting with 39 and down.

The humber of keystrokes contained in a format area has no bearing on what can be stored into the area. Only certain commands may be

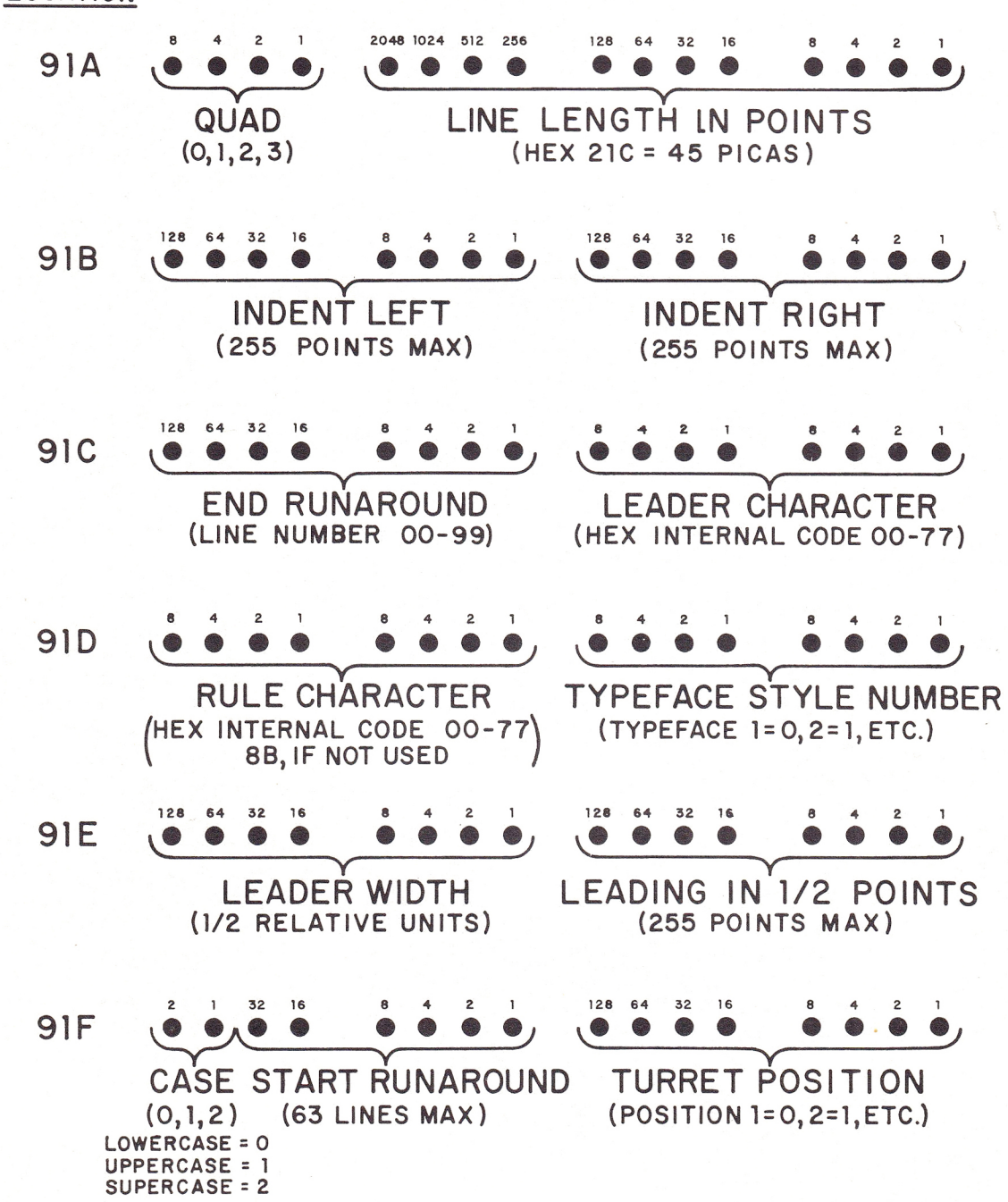


Figure 2-22 Format Locations

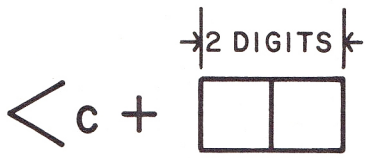
stored into a format. These are:

1. Quad Lock
2. Line Length
3. Indent Left
4. Indent Right
5. End Runaround
6. Leader Character
7. Rule Character
8. Typeface Number
9. Leader Width
10. Leading
11. Case Lock
12. Start Runaround
13. Lens (Turret Position)

You do not have to repeat the insertion of a function code for each format if it does not change. For example, if you have a string of formats with the same line length insert that line length once before the first format is stored. This line length would then remain in the active use area and could be stored in subsequent formats without being put in again.

Figure 2-22 illustrates how the first six words of the first format block begins at location 91A for format 01. Format 02 begins at location 920. Figures 2-23 and 2-24 are examples of formatting.

To call a format, use the following function code:

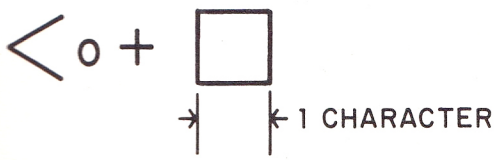


It is important to place a Quad Left, Carriage Return in the hyphenation mode of operation to get immediate operation of line length and leading. The Normal mode does not require the Quad Left, Return.

2.18 LOAD/GET STORED LINES

The stored line feature (16 stored lines of 32 characters per line) allows the user to store strings of text in memory and call them out at any time. Information is stored exactly as it appears on tape.

2.18.1 Loading Stored Lines - To load or store a stored line use the following function code:

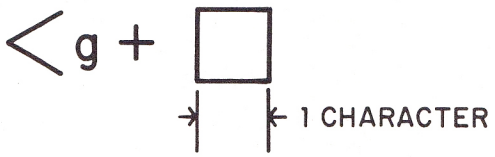


The character portion of the function code can be one of 16; for 727 MK-1 these apply: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, m, y, f, a, t, e, and for 730 MK-2 these apply: 1, 2, 3, 4, 5, 7, 8, a, e, i, o, u, y, l, n, comma. The locations these characters access for storage are shown in Table 2-3. Thus, if you have 0 as the character, location F50 will be accessed, I will access location EC0, etc. If less than 32 characters are used for one line, insert tape feeds into the empty positions.

Table 2-3 Stored Line Memory Locations

MK-1 Character	MK-2 Character	Location
1	1	EC0-ECF
2	2	ED0-EDF
3	3	EE0-EEF
4	4	EF0-EFF
5	5	F00-F0F
6	7	F10-F1F
7	8	F20-F2F
8	A	F30-F3F
9	e	F40-F4F
0	i	F50-F5F
m	o	F70-F7F
y	u	FB0-FBF
f	y	F60-F6F
a	l	F80-F8F
t	n	F90-F9F
e	comma	FAD-FAF

2.18.2 Getting Stored Lines - To get or call out a stored line at any point in the job, use one of the above mentioned characters and the following code:



You can also use a stored line code to call another stored line. This is known as chaining. When chained each stored line can only contain 31 characters and the last character must be left blank.

An example of chaining is shown on Figure 2-25.

2.19 BINARY NUMBERING SYSTEM

Because the Pacesetter is a digital computer controlled machine which works with binary numbers, an understanding of binary is required to achieve maximum usage of the machine. The best way to understand the binary system is to relate it to the decimal system which is used daily.

Figure 2-23 Format No. 1

Figure 2-24 Format No. 2

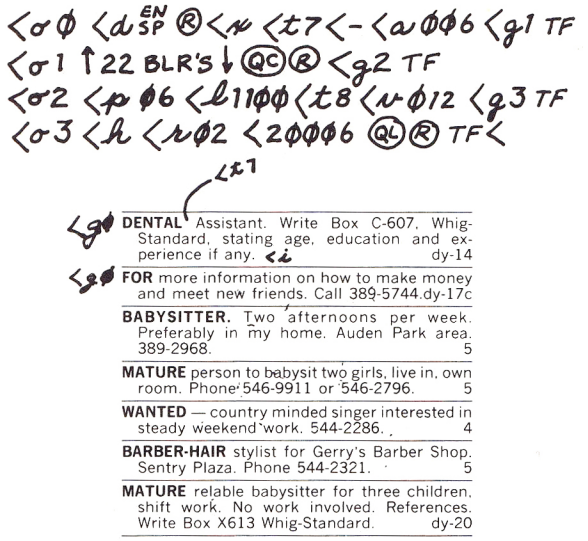

DENTAL Assistant. Write Box C-607, Whig-Standard, stating age, education and experience if any. dy-14
FOR more information on how to make money and meet new friends. Call 389-5744.dy-17c
BABYSITTER. Two afternoons per week. Preferably in my home. Auden Park area. 389-2968. 5
MATURE person to babysit two girls, live in, own room. Phone 546-9911 or 546-2796. 5
WANTED — country minded singer interested in steady weekend work. 544-2286. 4
BARBER-HAIR stylist for Gerry's Barber Shop. Sentry Plaza. Phone 544-2321. 5
MATURE relable babysitter for three children, shift work. No work involved. References. Write Box X613 Whig-Standard. dy-20

Figure 2-25 Stored Lines (chaining)

The decimal system consists of ten symbols or digits represented as 0123456789. Because there are ten digits in the decimal system, it is said to have a base of ten or radix of ten. Each digit in a decimal number represents a different power of ten which are always arranged so that the highest power is on the far left and the lowest power (0th power) is on the far right. For example, the digits in number 527 are named for the powers of ten they represent as shown below:

POWER	10^2	10^1	10^0
POWER VALUE	100	10	1
DECIMAL	5	2	7

0 order digit = $7 \times 10^0 = 7$
1st order digit = $2 \times 10^1 = 20$
2nd order digit = $5 \times 10^2 = 500$
527

In the example above, notice that 10^0 is equal to 1. A general rule in all number systems is that any number taken to the 0 power is equal to 1.

The binary system uses a base or radix of two and its digits are 0 and 1. These bits (binary digits) stand for powers of decimal 2, just as the decimal digits stand for powers of decimal 10. An example of converting the binary number 1011 is shown below:

POWER	2^3	2^2	2^1	2^0
POWER VALUE	8	4	2	1
BINARY	1	0	1	1

0 order digit = $1 \times 2^0 = 1$
1st order digit = $1 \times 2^1 = 2$
2nd order digit = $0 \times 2^2 = 0$
3rd order digit = $1 \times 2^3 = 8$
11

2.20 HEXADECIMAL NUMBERING SYSTEM

Although the computer does its calculations in binary digits, long strings of ones and zeros are awkward to handle and interpret. To eliminate this, the hexadecimal system was devised. Each hexadecimal number is represented by four binary digits. The four bits of each group represent a decimal number from 0 to 15. For example, 0101 1001 equals 59 in hexadecimal. Because the computer cannot handle double digit numbers (10 through 15), we use A through F respectively to represent these numbers. Table 2-4 shows the equivalents in decimal, binary and hexidecimal for numbers through decimal 49.

Table 2-4 Number Systems Equivalents

DECIMAL	BINARY	HEX
0	0000	0
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F
16	10000	10
17	10001	11
18	10010	12
19	10011	13
20	10100	14
21	10101	15
22	10110	16
23	10111	17
24	11000	18
25	11001	19
26	11010	1A
27	11011	1B
28	11100	1C
29	11101	1D
30	11110	1E
31	11111	1F
32	100000	20
33	100001	21
34	100010	22
35	100011	23
36	100100	24
37	100101	25
38	100110	26
39	100111	27
40	101000	28
41	101001	29
42	101010	2A
43	101011	2B
44	101100	2C
45	101101	2D
46	101110	2E
47	101111	2F
48	110000	30
49	110001	31

In Table 2-4 notice that the number which follows F is 10. This is not a decimal ten but a hexadecimal one and zero. Each of these numbers (1 and 0) represent four binary digits (0001 0000) or decimal 16.

2.20.1 Hexadecimal Addition - Addition in hexadecimal follows the same rules as in decimal. However, the use of alphanumeric symbols (letters and numbers) requires more thought on the user's part. For example, while 4 + 5 equals 9 in both decimal and hexadecimal 7 + 8 equals F (not 15) in hexadecimal. Table 2-5 should be an aid in helping you understand the addition of two hexadecimal numbers. To add two numbers, find one at the left side of the table and the other at the top. The sum will be the value shown at the intersection of the row and column indicated by the two numbers.

An example of hexadecimal addition with no carries is as follows:

```
  9 6 5 4 (38,484 decimal)
+ 4 5 2 8 (17,704 decimal)
-----------
  D B 7 C (56,188 decimal)
```

When the sum of two numbers exceed F, a carry of 1 is forwarded to the next highest order. Thus, 7 + 9 = 10 (0 with a carry of 1), 9 + 9 = 12 (2 with a carry of 1), etc. In a column which has a carry, mentally add a 1 to the smaller digit before consulting Table 2-5. An example of hexadecimal addition with carries is as follows:

```
    1
  3 F 9 7 (16,279 decimal)
+ A 4 2 B (42,027 decimal)
-----------
  E 3 C 2 (58,306 decimal)
```

Table 2-5 Hexadecimal Addition/Subtraction Table

	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10
1	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11
2	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12
3	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13
4	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14
5	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15
6	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16
7	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17
8	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18
9	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19
A	0B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19	1A
B	0C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19	1A	1B
C	0D	0E	0F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C
D	0E	0F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D
E	0F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E
F	10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F	20

2.20.2 Hexadecimal Subtraction - Subtraction in hexadecimal also follows the same rules as in decimal but again, because of alphanumeric symbols, it will require some practice. To subtract two numbers using Table 2-5 find the bottom number at the left side, follow the row in to the top number, then up the column to the top figure which represents the difference. An example of hexadecimal subtraction with no borrows is as follows:

```
  C D 9 F (52,639 decimal)
- 1 4 5 D ( 5,213 decimal)
-----------
  B 9 4 2 (47,426 decimal)
```

When the bottom number is larger than the top number, add a borrow of 1 to the top number only before finding the difference in Table 2-5. An example is as follows:

```
    12 19
     2  9 18
  D  3  A  8 (54,184 decimal)
- B  4  F  A (46,330 decimal)
-------------
  1  E  A  E ( 7,854 decimal)
```

In the first column (right hand), the A is larger than 8, so we borrow a 1 from the second column which changes the A in the second column to a 9 and add the 1 to the 8 making it 18 (one, eight - not eighteen). Referring to Table 2-5 it shows that 18 - A = E and we write it down as the difference. Proceeding to the second column, we find that F is larger than 9 so we must borrow a 1 from the 3 in the third column and change the 9 to 19. Table 2-5 shows that 9 - F = A and this is the difference for the second column. This same process can be used to solve the differences for columns three and four.

2.21 CHANGING CHARACTER WIDTH

There are two ways to change the stored width value of any character on a disc; punched tape or switches on the front panel. Two sources must be referred to in order to change a character width. They are the "C" sheet and width table starting address.

Shown in Table 2-6 is an example of a "C" sheet packaged with each character disc. The one shown is Photon's standard eight typeface disc which contains the placement of all the characters in various typefaces on the disc. In the center of the sheet, under the heading FONT SCHEME, the characters are listed in disc sequence and show tape code configuration. Under each typeface number, the decimal full units are given for each character.

1ST HALF								
DISC SEQUENCE	1		3		5		7	
	CR 381	UNIT	TBK 383	UNIT	TM 149	UNIT	TXB 387	UNIT
1		8		9		9		12
2		8		9		9		12
3		8		9		9		12
4		8		9		9		12
5		8		9		9		12
6		8		9		9		12
7		8		9		9		12
8		8		9		9		12
9		8		9		9		12
10		8		9		9		12
11		8		9		9		12
12		8		9		5		7
13		5.5		6		5		8
14		9		10		8		11
15		6.5		7		5		7
16		9.5		11		9.5		11
17		5.5		6		4		5
18		9.5		11		8.5		11
19		8		9		6		8
20		9		10		9		11
21		8		9		6		8
22		9.5		11		8.5		11
23		9.5		11		9.5		11
24		5.5		6		4		5
25		9.5		11		8.5		10
26		9		10		7		8
27		6.5		7		5.5		7
28		16		18		12.5		15
29		9.5		11		8		11
30		13.5		15		12		15
31		9.5		11		9.5		11
32		9.5		11		9.5		11
33		9.5		11		9.5		11
34		9.5		11		7.5		10
35		9.5		11		8		11
36		9.5		11		9.5		11
37		6.5		7		4		5
38		9.5		11		8		12
39		8		9		7.5		9
40		5.5		6		4.5		6
41		5.5		6		4.5		6
42		8		9		4.5		6
43		5.5		6		4		5
44	EM MISC LDR 320 EN MISC LDR 315	16	EM MISC LDR 324 EN MISC LDR 401	18	-MATH B-4	15	-MATH C-4	15
45		8		9	] BRAK 237	5	] BRAK 181	6
46		16		18		18	ALT 20	15
47		8		9		7		9
48	@ ALT 24	15	@ ALT 24	18	@ ALT 24	16	@ ALT 24	15
49	1/8 ALT 14	16	1/8 ALT 44	18	1/8 ALT 63	18	1/8 ALT 14	15
50	1/4 ALT 12	16	1/4 ALT 42	18	1/4 ALT 61	18	1/4 ALT 12	15
51	3/8 ALT 15	16	3/8 ALT 45	18	3/8 ALT 64	18	3/8 ALT 15	15
52	1/2 ALT 11	16	1/2 ALT 41	18	1/2 ALT 60	18	1/2 ALT 11	15
53	5/8 ALT 16	16	5/8 ALT 46	18	5/8 ALT 65	18	5/8 ALT 16	15
54	3/4 ALT 13	16	3/4 ALT 43	18	3/4 ALT 62	18	3/4 ALT 13	15
55	7/8 ALT 17	16	7/8 ALT 47	18	7/8 ALT 66	18	7/8 ALT 17	15
56		16		18		18		18
57		12.5		14		11		14
58		9.5		11		9		9
59		8		9		4.5		6
60		8		9		5		7
61	+ ALT 21	16	+ ALT 21	18	+ MATH B-2	15	+ MATH C-2	15
62		13.5		15		8.5		9
63		9.5		13		8		9
64		12.5		14		11		13
65		7		8		4.5		6
66		13.5		15		12.5		14
67		9.5		11		9		10
68		12.5		14		13		15
69		13.5		15		9		11
70		13.5		15		11		13
71		13.5		15		11		12
72		11.5		13		7		9
73		13.5		15		11		12
74		11.5		13		11		11
75		12.5		14		8		9
76		16		18		14		15
77		13.5		15		9		11
78		16		18		16		18
79		12.5		14		8.5		11
80		13.5		15		13		14
81		12.5		14		9		11
82		12.5		14		10		13
83		13.5		15		9.5		12
84		12.5		14		13		15
85		9.5		11		7		9
86		13.5		15		10		13
87		10.5		12		9		11
88	COMMA	5.5	COMMA	6	4	9	4	10
89	PERIOD	5.5	PERIOD	6	# ALT 25	9	# ALT 25	12
90		8		9		4.5		6
91		5.5		6		4		5
92	EM MISC LDR 360 EN MISC LDR 319	16	EM MISC LDR 321 EN MISC LDR 404	18	@ EL 23	9	@ EL 27	9
93		8		9	[BRAK 236	5	[BRAK 180	6
94		8		9		9		9
95		8		9		9		10
96	BLR 46	18	HR-9	18	BLR 116	18	BLR 138	18
97		5		5		5		6
98		5		5		5		6
99		5		5		5		6
100		5		5		5		6
101		5		5		5		6
102	MF-248	5	MF-242	5	MF-52	5	MF-261	6
103		5		5		5		6
104		5		5		5		6
105		5		5		5		6
106		5		5		5		6
107		5		5		5		6
108		5		5		5		6
109	= ALT 22	16	= ALT 22	18	= MATH B-1	15	= MATH C-1	15
110	@ EL 22	9	@ EL 26	9	@ EL 24	9	@ EL 26	9
111	□ BX 23	15	□ BX 23	15	□ BX 23	15	□ BX 23	15
112	• BUL 39	8	• BUL 153	9	• BUL 149	9	• BUL 35	8

FONT SCHEME				
DISC SEQUENCE	CUSTOMER CHARACTER SELECTION	PHOTON CHARACTER SELECTION	TAPE CODE
1		1	1-2-4-5-6
2		2	1-2-3-6
3		3	1-2
4		4	1-3-5
5		5	1-6
6		6	1-2-4-6
7		7	1-2-3-4
8		8	1-3-4
9		9	1-5-6
10		ZERO	1-3-4-6
11		$	1-2-3
12		)	1-2-6
13		HYPHEN	1-2-5
14		e	2
15		t	6
16		a	2-3
17		i	3-4
18		n	4-5
19		s	2-4
20		o	5-6
21		r	3-5
22		h	4-6
23		d	2-5
24		l	3-6
25		u	2-3-4
26		c	3-4-5
27		f	2-4-5
28		m	4-5-6
29		y	2-4-6
30		w	2-3-6
31		p	3-4-6
32		g	3-5-6
33		b	2-5-6
34		v	3-4-5-6
35		k	2-3-4-5
36		q	2-3-4-6
37		j	2-3-5
38		x	2-4-5-6
39		z	2-6
40		COMMA	1-4-5
41		PERIOD	1-4-5-6
42		:	1-3-5-6
43		UNQUOTE	1-5
44		EM LDR	1-4-6
45		EN LDR	1-2-3-4-6
46		%	1-3-6
47		F/B	3
48		@	1-4
49		1/8	1-2-4-5-6
50		1/4	1-2-3-6
51		3/8	1-2
52		1/2	1-3-5
53		5/8	1-6
54		3/4	1-2-4-6
55		7/8	1-2-3-4
56		EM DASH	1-3-4
57		&	1-5-6
58		?	1-3-4-6
59		!	1-2-3
60		(	1-2-6
61		+	1-2-5
62		E	2
63		T	6
64		A	2-3
65		I	3-4
66		N	4-5
67		S	2-4
68		O	5-6
69		R	3-5
70		H	4-6
71		D	2-5
72		L	3-6
73		U	2-3-4
74		C	3-4-5
75		F	2-4-5
76		M	4-5-6
77		Y	2-4-6
78		W	2-3-6
79		P	3-4-6
80		G	3-5-6
81		B	2-5-6
82		V	3-4-5-6
83		K	2-3-4-5
84		Q	2-3-4-6
85		J	2-3-5
86		X	2-4-5-6
87		Z	2-6
88		COMMA	1-4-5
89		PERIOD	1-4-5-6
90		:	1-3-5-6
91		QUOTE	1-5
92		EM LDR	1-4-6
93		EN LDR	1-2-3-4-6
94		¢	1-3-6
95		*	3
96		BLR	1-4
97		1	1-2-4-5-6
98		2	1-2-3-6
99		3	1-2
100		4	1-3-5
101		5	1-6
102		6	1-2-4-6
103		7	1-2-3-4
104		8	1-3-4
105		9	1-5-6
106		ZERO	1-3-4-6
107		$	1-2-3
108		¢	1-2-6
109		=	1-2-5
110		®	2
111		□	6
112		*BULLET	2-3

2ND HALF										
DISC SEQUENCE	2		4		6		8			
	CRB 382	UNIT	TB 384	UNIT	TB 27	UNIT	TXBC 218	UNIT		
1		8		9		10	ALT 30	10		
2		8		9		10		10		
3		8		9		10		10		
4		8		9		10		10		
5		8		9		10		10		
6		8		9		10		10		
7		8		9		10		10		
8		8		9		10		10		
9		8		9		10		10		
10		8		9		10		10		
11		8		9		10		9		
12		8		9		7		6.5		
13		5.5		6		6		7		
14		9		10		9		8		
15		6.5		7		6		6		
16		9.5		11		10		9		
17		5.5		6		4.5		4.5		
18		9.5		11		10		9		
19		8		9		7		7		
20		9		10		9		8.5		
21		8		9		6		6.5		
22		9.5		11		10		9		
23		9.5		11		10		9		
24		5.5		6		4.5		4.5		
25		9.5		11		10		9		
26		9		10		7		6.5		
27		6.5		7		6		6		
28		16		18		15		14		
29		9.5		11		9		8.5		
30		13.5		15		15		12.5		
31		9.5		11		10		9		
32		9.5		11		10		9		
33		9.5		11		10		9		
34		9.5		11		9		8.5		
35		9.5		11		9		9		
36		9.5		11		10		9		
37		6.5		7		4.5		5		
38		9.5		11		9		9		
39		8		9		8		7		
40		5.5		6		5		5		
41		5.5		6		5		5		
42		8		9		6		6		
43		5.5		6		5		5.5		
44	EM MISC LDR 318 EN MISC LDR 317	16	EM MISC LDR 325 EN MISC LDR 405	18	-MATH C-4	15	-MATH C-4	16		
45		8		9	] BRAK 171	7	] BRAK 79	6		
46		16		18		18		18		
47		8		9		9		9		
48	@ ALT 24	15	@ ALT 24	18	@ ALT 24	15	@ ALT 24	16		
49	1/8 ALT 14	16	1/8 ALT 14	18	1/8 ALT 142	18	1/8 ALT 14	17		
50	1/4 ALT 12	16	1/4 ALT 12	18	1/4 ALT 140	18	1/4 ALT 12	17		
51	3/8 ALT 15	16	3/8 ALT 15	18	3/8 ALT 143	18	3/8 ALT 15	17		
52	1/2 ALT 11	16	1/2 ALT 11	18	1/2 ALT 139	18	1/2 ALT 11	17		
53	5/8 ALT 16	16	5/8 ALT 16	18	5/8 ALT 144	18	5/8 ALT 16	17		
54	3/4 ALT 13	16	3/4 ALT 13	18	3/4 ALT 141	18	3/4 ALT 13	17		
55	7/8 ALT 17	16	7/8 ALT 17	18	7/8 ALT 145	18	7/8 ALT 17	17		
56		16		18		18		16		
57		12.5		14		15		12.5		
58		9.5		11		9		7		
59		8		9		6		5		
60		8		9		7		6.5		
61	+ ALT 21	16	+ ALT 21	18	+ MATH C-2	15	+ MATH C-2	15		
62		13.5		15		9		8		
63		11.5		13		9		9		
64		12.5		14		12		11		
65		7		8		5		5.5		
66		13.5		15		13		10.5		
67		9.5		11		9		9		
68		12.5		14		13		11		
69		13.5		15		10		10		
70		13.5		15		12		10.5		
71		13.5		15		11		10.5		
72		11.5		13		7		8		
73		13.5		15		12		10.5		
74		11.5		13		11		9		
75		12.5		14		8		8		
76		16		18		15		14		
77		13.5		15		11		10.5		
78		16		18		16		15		
79		12.5		14		9		10		
80		13.5		15		13		9.5		
81		12.5		14		10		10.5		
82		12.5		14		12		11		
83		13.5		15		11		11		
84		12.5		14		13		11		
85		9.5		11		8		7		
86		13.5		15		12		10.5		
87		10.5		12		10		9.5		
88	COMMA	5.5	COMMA	6	4	10	4	10		
89	PERIOD	5.5	PERIOD	6	# ALT 25	10	# ALT 25	7		
90		8		9		6		5		
91		5.5		6		5		5.5		
92	EM MISC LDR 318 EN MISC LDR 317	16	EM MISC LDR 325 EN MISC LDR 405	18	@ EL 27	9	@ EL 21	9		
93		8		9	[BRAK 170	7	[BRAK 78	6		
94		8		9		10		7		
95		8		9		10		9		
96	BLR 46	18	HR-9	18	BLR 116	18	BLR 138	18		
97		5		5		5		5		
98		5		5		5		5		
99		5		5		5		5		
100		5		5		5		5		
101		5		5		5		5		
102	MF-250	5	MF-241	5	MF-83	5	MF-107	5		
103		5		5		5		5		
104		5		5		5		5		
105		5		5		5		5		
106		5		5		5		5		
107		5		5		5		4.5		
108		5		5		5		4		
109	= ALT 22	16	= ALT 22	18	= MATH C-1	15	• MATH C-1	15		
110	@ EL 22	9	@ EL 26	9	@ EL 26	9	@ EL 22	9		
111	□ BX 23	15	□ BX 23	15	□ BX 23	15	□ BX 23	15		
112	• BUL 39	8	• BUL 153	9	• BUL 144	8	• BUL 61	11		

UNSHIFT
SHIFT
SUPER SHIFT

UNITS					
ROW	THSP	EN SP	EM SP	
1	5.5	8	16	1ST HALF
3	6	9	18	
5	4.5	9	18	
7	6	12	24	
2	5.5	8	16	2ND HALF
4	6	9	18	
6	5	10	20	
8	5	10	20	

NO.	DATE	REVISION

PHOTON — WORLD LEADER IN TYPESETTING

PACESETTER
DISC ARRANGEMENT

PART NO. 14F-00009 (8-3)

DATE 8-25-71
DRAWN BY
CHECKED
APPROVED

1ST HALF								
LP LM LR	1	CROWN 381	LP UM LR	3	TECHNO BOOK 383	UP LM LR	5	TECHNO MEDIUM 149	UP UM LR	7	TECHNO EXTRA BOLD 387
2ND HALF											
LP LM UR	2	CROWN BOLD 382	LP UM UR	4	TECHNO BOLD 384	UP LM UR	6	TECHNO BOLD 27	UP UM UR	8	TECHNO EXTRA BOLD COND. 218

OUTER PAIR
INNER PAIR
OUTER ROW
INNER ROW
OUTER ROW
INNER ROW

UP = UPPER PAIR
LP = LOWER PAIR
UM = UPPER MATRIX
LM = LOWER MATRIX
UR = UPPER ROW
LR = LOWER ROW

CUSTOMER'S NAME _____
APPROVED BY _____
DATE _____

TAPE CODE				LENS SELECTION	CUSTOMER LENSES
1	THIN SP	LENS 1	1-2-3-5-7	5	
1-3-4-5	EN SP	LENS 2	2-3-5-7	18	
1-2-4	EM SP	LENS 3	3-5-7	12	
4	SP BD	LENS 4	1-3-5-7	72	
3-7	1 UNIT SP	LENS 5	1-5-7	6	
5	RETURN	LENS 6	5-7	10	
1-2-4-5	QUAD LT.	LENS 7	2-5-7	14	
1-3-4-5-6	QUAD CTR	LENS 8	1-2-5-7	48	
1-3-7	QUAD RT.	LENS 9	4-7	7	
1-2-3-5	STOP (FLG)	LENS 10	1-4-5-7	36	
2-3-5-6	SHIFT	LENS 11	2-4-7	11	
2-3-4-5-6	UNSHIFT	LENS 12	1-2-4-7	60	
2-4-6-7	SUPER SH.	LENS 13	3-4-7	8	
1-2-3-5-6	LOW. ROW	LENS 14	1-3-4-7	9	
1-2-5-6	UP. ROW	LENS 15	2-3-4-7	24	
1-3	LOW. MAT.	LENS 16	1-2-3-4-7	30	
1-2-3-4-5	UP. MAT.	1-6-7	INST. LDR.		
2-7	LOW. PR.	3-5-6-7	CUT OFF RL		
1-7	UP. PR.	1-5-6-7	NO WIDTH		
2-3-7	LEADING				
1-2-3-7	ADD. LEAD				
4-5-7	LINE LTH.				
1-2-7	KILL LINE				
1-2-3-4-5-6	DELETE				
2-5-6-7	NO FLASH				
2-6-7	TAB				

Table 2-6 Example of Photon "C" Sheet

Table 2-7A
Width Table Starting Addresses (Hex)

Typeface 1 = 0700
Typeface 2 = 0738
Typeface 3 = 0770
Typeface 4 = 07A8
Typeface 5 = 07E0
Typeface 6 = 0818
Typeface 7 = 0850
Typeface 8 = 0888

Table 2-7A contains the starting address location in hexadecimal for each of the eight width tables stored into memory, via the main program tape.

As an example of changing a character width, via a tape patch, let us subtract 2 relative units from the EM DASH using CROWN 381. Because CROWN 381 was selected, we refer to the "C" sheet and find it is in typeface 1 and its disc sequence is 56. The starting address for typeface 1 is hex 0700 as shown in Table 2-7A.

To find the hex address location for a disc sequence subtract one from the disc position, divide ty two, and convert to hex. If you have a remainder of one after you divide, your character is in the low order bits of that location.

In the example, we subtract 1 from 56 and divide by two. This will leave 27 and a carry of one. Referring to Table 2-4 the hex value for 27 is 1B.

To find the exact location of the EM DASH in memory, add the starting address (0700) and address location 1B. The sum of these two numbers is 071B in hex. Refer to Table 2-5, when addition of two hexadecimal numbers become complicated.

NOTE

The address location actuall contains two characters. In the example used, we are addressing the EM DASH (low order) and the fraction 7/8 (high order). Therefore, we must process two characters even though only one is being changed.

Referring once again to Table 2-6 we find that the stored width for disc sequence 56 in decimal units is 16. Because the width change must be entered in hexadecimal half units, we first subtract 2 from 16 which equals 14 decimal full units, double it for 28 decimal half units and refer to Table 2-4 for conversion of decimal 28 to hexadecimal which is 1C. The new width value of the EM DASH (1C) is now ready to be put on tape.

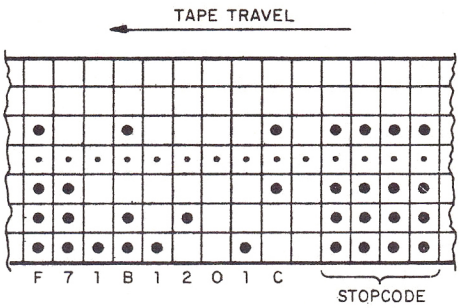


Figure 2-26 Six Level Tape Patch for Subtracting Two Relative Units from the EN DASH

Figure 2-26 illustrates the six level tape patch required to change the width of the EM DASH character. Only four channels of any frame can contain perforations. The fifth and sixth channels must be left blank. The letter F in the first frame is substituted for the zero in memory location 071B, to begin operations. The next three frames are then perforated to represent the remainder of the address (71B).

The next frame represents the number of words being processed. A word represents 16 bits, which on six-level tape represents 4 frames. Because we are dealing with one location (word) the next frame must be perforated as a one.

The width of the two characters is now perforated in the next four frames. The high order character (7/8) is always entered first. Because its width was not changed, we perforate hex 20 in two frames. The next two frames will then contain the width change of the EM DASH character (1C).

To complete the patch skip at least one frame and enter a STOPCODE which is four frames of the first four bits perforated (FFF).

NOTE

Before processing tape patch, process the first portion of your SIX LEVEL LOADER tape. After patch tape has been loaded, process the second portion of the SIX LEVEL tape.

The eight level tape patch required to change the width of the EM DASH character is illustrated on Figure 2-27. No special loader tape is required. As shown on the figure, the eight

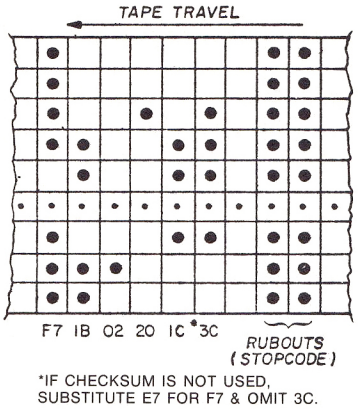


Figure 2-27 Eight Level Tape Patch for Subtracting Two Relative Units from the EM DASH

level tape contains two hex values in a frame because all eight channels are utilized.

In addition, the letter F is substituted for the zero when checksum is used. The checksum, when the tape is processed, indicates that the patch was loaded correctly. If checksum is not utilized, substitute hex E for zero. Using checksum we perforate the first frame as F7 and the second frame 1B. Information for wording and data is then entered in the next three frames.

To arrive at the checksum figure, add the widths in hexadecimal (20 + 1C = 3C) and enter this in the next frame. Omit this if checksum is not used.

To complete the patch, skip at least one frame and enter two RUBOUTS (STOPCODE) by perforating all eight channels in the next two frames.

As an example of changing character width using the computor panel, let us change the lower case "e" in typeface one (Crown 381) from 9 relative units to 8.5 relative units. Referring to the "C" sheet (Table 2-6) the letter "e" in typeface 1 is disc sequence 14. Table 4-7A contains the starting address for typeface 1 which is 0700 and converting disc sequence 14 for an address location gives us 006 (13 divided by 2 equals 6 in decimal and 6 in hex). Adding 0700 and 006 will give us the location of lower case "e" in memory. That address is 0706. This address also accesses the location of disc sequence 13 or the HYPHEN.

After removing the front panel of the machine to expose the control panel and placing all switches to the up position, place the SENSE 2 MEM ACCESS and 2, 3, 9, 11 (0706) switches to their down positions. Press and release the RESET and RESTART switches and observe that the DATA indicator and indicators 1, 2, and 4 are illuminated. Indicators 9, 10, and 12 will also be illuminated. This is the width of the high order character for this address which is the HYPHEN (OB). Since we do not wish to change the width of the HYPHEN, it can be re-entered into memory by placing the RUN/STOP switch to the STOP position and pressing and releasing the RESTART switch.

NOTE

If you wish to change the high order bits; place switches 1 through 12 in the up position, the STORE switch to the down position, calculate the change from decimal units to hexadecimal half units, position switches 1 through 8 for new value, and press and release the RESTART switch.

As previously mentioned during the tape patch discussion, a width change must be entered in hex half units. To accomplish this for the example of changing 9 relative units to 8.5 relative units, we double the 8.5 to get 17 decimal half units and refer to Table 2-4 for converting decimal 17 to hexadecimal 11. To enter this new value (11) place switches 1 and 5 only to the down position, the STORE switch to the down position, and press and release the RESTART switch. The new width value for the letter "e" is now stored in memory. Place all switches on the control panel to the up position.

To verify that the contents of location 0706 are now OB11, place the SENSE 2, MEM Access, and 2, 3, 9, 10, 11 (0706) switches to their down positions. Press and release the RESET and RESTART switches and observe that the DATA indicator and indicators 1, 2 and 4 (OB) are illuminated.

Place the RUN/STOP switch in the STOP position, press and release the RESTART switch twice (once on 730 MK-2) and observe that indicators 1 and 5 (11) are illuminated. Ignore indicators 9 through 12.

Place the SI/SS switch in the SS position and press and release the RESTART switch twice to re-enter OB11 back into memory. Place all switches on the control panel to the up position and replace front panel.

2.22 CHANGING STATUS TABLE

The status table (Table 2-7), which was loaded into memory as a part of the main program

Table 2-7 TTS/Wire Service Status Table - Typical LO-Speed Layout

Memory Location (Hex) (TTS)	TTS Tape Code (Hex)	Function/Character	Internal Code (Hex) (TTS)	(WS)
680	00	Tape Feed	8B	8B
680	01	Thin Space*	70	8B
681	02	E	0D	
681	03	3	02	
682	04	Fraction Bar (1)*	2E	8B
682	05	LM*	95	
683	06	A	0F	
683	07	$*	0A	
684	08	I.W. Space	86	86
684	09	Add Thin*	2F	86
685	0A	S	12	
685	0B	EM Space*	73	
686	0C	I	10	
686	0D	8*	07	
687	0E	U	18	
687	0F	7*	06	
688	10	C.R.*	80	80
688	11	Quote*	2A	
689	12	D	16	
689	13	Hyphen	8A	
68A	14	R	14	
68A	15	4	03	
68B	16	J	24	
68B	17	Bell*	91	8B
68C	18	N	11	
68C	19	Comma	27	
68D	1A	F	1A	
68D	1B	Quad Left*	98	8B
68E	1C	C	19	
68E	1D	EN Space*	72	8B
68F	1E	K	22	
68F	1F	UMATR*	B1	8B
690	20	T	0E	
690	21	5	048B	
691	22	Z	26	
691	23	PAREN*	0B8B	
692	24	L	17	
692	25	PERCENT (TTS)* VERTICAL RULE (NS)	2D	
693	26	W	1D	
693	27	2	01	
694	28	H	15	
694	29	EM LD*	2B	
695	2A	Y	1C	
695	2B	6	05	
696	2C	P	1E	
696	2D	Zero	09	
697	2E	Q	23	
697	2F	EN LDR*	2C	
698	30	Letter O	13	
698	31	9*	08	
699	32	B	20	
699	33	Upper Rail	94	
69A	34	G	1F	
69A	35	Semi-Colon*	29	
69B	36	Shift*	9C	
69B	37	Lower Rail*	83	
69C	38	M	1B	
69C	39	Period	28	
69D	3A	X	25	
69D	3B	1 (one)	00	
69E	3C	V	21	
69E	3D	Quad Center*	9A	8B
69F	3E	Unshift*	9B	
69F	3F	Rubout*	8B	
6A0	40	Stopcode	82	8B
6A0	41	—	8B	
6A1	42	End Runaround (Bell + e)	B0	
6A1	43	Indent Text Left (Bell + 3)	9F	
6A2	44	—	8B	
6A2	45	—	8B	
6A3	46	Add Lead	AC	
6A3	47	—	8B	

Table 2-7 TTS/Wire Service Status Table - Typical LO-Speed Layout (Cont.)

Memory Location (Hex) (TTS)	TTS Tape Code (Hex)	Function/Character	Internal Code (Hex) (TTS) (WS)
6A4	48	Change Set Width	89
6A4	49	—	8B
6A5	4A	Store Format (Bell + s)	AA
6A5	4B	—	8B
6A6	4C	Insert Leader (Bell + i)	A5
6A6	4D	—	8B
6A7	4E	Allow Flash (Bell + u)	8E
6A7	4F	—	8B
6A8	50	—	8 8B
6A8	51	—	8B
6A9	52	Define Leader	90
6A9	53	Zero Lead	B2
6AA	54	Start Runaround (Bell + r)	AD
6AA	55	Indent Right (Bell + 4)	A9
6AB	56	Define Vertical Rule (Bell + j)	A4
6AB	57	—	8B
6AC	58	Set Normal	AE
6AC	59	Divide Leader Space	93
6AD	5A	Kill Word (Bell + f)	9E
6AD	5B	—	8B
6AE	5C	Call Format (Bell + 3)	A3
6AE	5D	—	8B
6AF	5E	Kill Line (Bell + k)	A8
6AF	5F	—	8B
6B0	60	Style	81
6B0	61	Force Justify	A7
6B1	62	Tab (Bell + z)	85 8B
6B1	63	—	8B
6B2	64	Line Length (Bell + 1)	97
6B2	65	—	8B
6B3	66	Store Leader Width (Bell + W	96
6B3	67	Indent Left (Bell + 2)	A6
6B4	68	Set Hyphenation (Bell + h)	AF
6B4	69	—	8B
6B5	6A	Supercase (Bell + y)	9D
6B5	6B	Indent Both (Bell + 6	AB
6B6	6C	Size (Bell + p)	88
6B6	6D	Zero Width (Bell + Zero)	8C
6B7	6E	Quad Right (Bell + q)	99
6B7	6F	—	8B
6B8	70	Load Stores Codes (Bell + letter o)	A0
6B8	71	—	8B
6B9	72	No Flash Next Character (Bell + b)	92
6B9	73	—	8B
6BA	74	Get Stored Codes (Bell + g)	8F
6BA	75	—	8B
6BB	76	—	8B
6BB	77	—	8B
6BC	78	Mortice (Bell + m)	87
6BC	79	Cancel Flash (Bell + period)	8D
6BD	7A	Cancel Indent (Bell + x)	A1
6BD	7B	One Unit (Bell + one)	71
6BE	7C	Leading in ½ points (Bell + v)	84
6BE	7D	—	8B
6BF	7E	—	8B
6BF	7F	—	8B

Table 2-8 Fixed Widths

Typeface	Memory Location (Hex)	Internal Code	Data (Hex)	Width in Decimal Full Units
1 (Thin Space)	08C0	70	0B	5.5
1 (1 Unit Space)	08C0	71	02	1
1 (En Space)	08C1	72	10	8
1 (Em Space)	08C1	73	20	16
1	08C2	74	00	0
1	08C2	75	00	0
1	08C3	76	00	0
1	08C3	77	00	0
2 (Thin Space)	08C4	70	0B	5.5
2 (1 Unit Space)	08C4	71	02	1
2 (En Space)	08C5	72	10	8
2 (Em Space)	08C5	73	20	16
2	08C6	74	00	0
2	08C6	75	00	0
2	08C7	76	00	0
2	08C7	77	00	0
3 (Thin Space)	08C8	70	0C	6
3 (1 Unit Space)	08C8	71	02	1
3 (En Space)	08C9	72	12	9
3 (Em Space)	08C9	73	24	18
3	08CA	74	00	0
3	08CA	75	00	0
3	08CB	76	00	0
3	08CB	77	00	0
4 (Thin Space)	08CC	70	0C	6
4 (1 Unit Space)	08CC	71	02	1
4 (En Space)	08CD	72	12	9
4 (Em Space)	08CD	73	24	18
4	08CE	74	00	0
4	08CE	75	00	0
4	08CF	76	00	0
4	08CF	77	00	0
5 (Thin Space)	08D0	70	09	4.5
5 (1 Unit Space)	08D0	71	02	1
5 (En Space)	08D1	72	12	9
5 (Em Space)	08D1	73	24	18
5	08D2	74	00	0
5	08D2	75	00	0
5	08D3	76	00	0
5	08D3	77	00	0
6 (Thin Space)	08D4	70	0A	5
6 (1 Unit Space)	08D4	71	02	1
6 (En Space)	08D5	72	14	10
6 (Em Space)	08D5	73	28	20
6	08D6	74	00	0
6	08D6	75	00	0
6	08D7	76	00	0
6	08D7	77	00	0
7 (Thin Space)	08D8	70	0C	6
7 (1 Unit Space)	08D8	71	02	1
7 (En Space)	08D9	72	18	12
7 (Em Space)	08D9	73	30	24
7	08DA	74	00	0
7	08DA	75	00	0
7	08DB	76	00	0
7	08DB	77	00	0
8 (Thin Space)	08DC	70	0A	5
8 (1 Unit Space)	08DC		02	1
8 (En Space)	08DD	72	14	10
8 (Em Space)	08DD	73	28	20
8	08DE	74	00	0
8	08DE	75	00	0
8	08DF	76	00	0
8	08DF	77	00	0

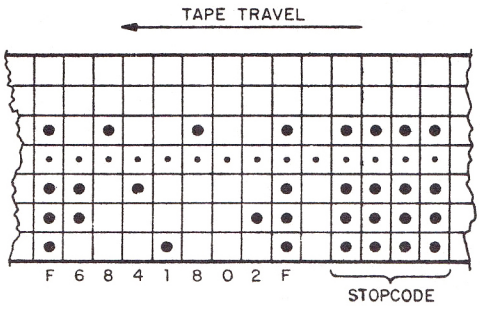


Figure 2-28 Six Level Tape Patch for Changing IW SPACE to CARRIAGE RETURN

tape, will decode TTS or wire service tape codes into flashable characters or functions. When using off-line keyboards, a special status table must be loaded into the main program prior to processing their tapes.

An illustration of the TTS six level tape patch required to change the I½W½ Space to a Carriage Return is shown on Figure 2-28. The first four frames represent the memory location for the I.W. Space and ADD Thin (0684). The zero is replaced by an F. The next frame represents the number of words being processed which is one. The 80 represents the internal code for Carriage Return (refer to location in Table 2-7) and 2F is the internal code for Add Thin which is not being changed. We now complete the tape patch with a STOPCODE.

NOTE

Before processing tape patch process the first portion of your Six Level Loader tape. After patch has been loaded, process the second portion of the Six Level Loader tape.

2.23 FIXED WIDTHS

When the main program was loaded into the Pacesetter, it allowed for eight typeface sections with four addresses per section to contain fixed widths, as shown in Table 2-8. Two addresses of each typeface were assigned functions and formatted on the program tape. Each section is accessed sequentially by internal codes 70 through 77.

To change a width value in the first two memory locations of a typeface section, address that location found in Table 2-8 and enter the new value in hex half units. You must process the complete address location even though only one of the values is changing. Also, any changes to one typeface must be made to the other seven.

Inserting a width value in the last two memory locations of a typeface involves using the TTS status table (Table 2-7) in conjunction with Table 2-8. Referring to the Function/Character column in Table 4-7 the asterisk represents a particular key which when pressed along with the BELL key will allow us to access a location not used in the status table. For example, let us add a 2 unit width value to be accessed by BELL + $. The BELL key when pressed will produce an internal code of hex 91. It also produces a second internal code of hex 40. We now add to the TTS tape code for the dollar sign which is 07 and find the memory location for tape code 47 which is the low order of 6A3. Into this location we now insert an internal code from Table 2-8 which is not being used. If 74 is chosen insert into low order of 6A3, remembering that both location values must be processed.

The 2 unit value must now be inserted in hex half units into the fixed width table. Internal code 74 in typeface 1 is at memory location high order 08C2. Converting to hex half units means doubling the unit value of 2 to 4, converting to hex (04) and inserting this into location 08C2. Once again the entire location must be processed. With this completed the 04 value must now be inserted into the memory locations for typefaces 2 through 8 using internal code 74 as a guide. Thus, each time the BELL key is pressed along with the $ key it will produce a fixed width value of 2 units.

If TTS code inputs are not used, determine a character or function not being used and obtain its hex value by punching it into tape. This value must now be added to your BELL value (40) and then divided by two. The answer is then added to location 680 (beginning of status table) to obtain the location for inserting the width table internal code. A remainder of one when the function or character was added to the BELL code and divided by two means the value must be inserted into the low order of that location. A remainder of zero means it must be inserted into the high order. The next step is to look at this location for a stored value of 8B. This ignore code means the location is not used.

If there is no value stored in this location insert a fixed width internal code from Table 2-8 and insert the desired width value in hex into the internal code memory location for all eight typefaces.

As an example let us add a ½ unit width value

to be accessed by BELL + QUOTE. Assuming the BELL hex value is 40 and the QUOTE hex value is 35 (read from tape), add the two values and divide by 2. Dividing in hex, two into seven gives a 3 with a remainder of one. A remainder of one in the second order of hex equals 16 which must be added to the five giving us 21. Two into 21 equals 10 or A and a remainder of one. Thus, 40 + 35 equals 75 which when divided by 2 will equal 3A and a remainder of 1. To find the address location add 680 and 3A which is 6BA. The remainder of one says it is the low order of 6BA to assure it does not contain a stored value. If it doesn't we select an internal code from Table 2-8 and insert it into the low order location of 6BA. The hex value of a ½ unit (1) is then inserted into the selected internal code memory location for all eight typefaces. Remember to process the entire location for the above operations.

2.24 LENS INITIALIZATION

To assure that all point sizes line up at the left hand side of the copy the Pacesetter program provides a portion of memory for any necessary adjustments as shown in Table 2-9. The values are not given for they will vary from machine to machine. They may be viewed by accessing a particular memory position containing a certain point size. These values, which were loaded into the machine when the selected PT INIT section of the lens initialization tape was processed, represent the number of ½ units the carriage must be moved.

Assure that the point size you are initializing to is the same selection made when the PT INIT section of the lens initialization tape was processed.

To change a value run copy of the two sizes to be aligned and measure the distance in inches between the two left hand edges. Now convert the inches to points (1 inch = 72 points) and put the number of points into the following formula:

$$\frac{\text{DISTANCE TO MOVE IN POINTS} \times 36}{\text{POINT SIZE TO BE ALIGNED}} = \text{DECIMAL HALF UNITS}$$

The new value can now be added to (move size right) or subtracted from (move size left) the stored value and inserted into memory.

2.25 LENS SIZE

Contained in the Pacesetter's memory are eight locations which contain the size values of each lens in a machine, up to a maximum of sixteen. Each location contains the value of two lenses as shown in Table 2-10. Values are not given in the table for they vary from machine to machine. The values for any lens originally installed in the machine were loaded into memory when the size section of the lens initialization tape was processed.

These values are used in calculations for line justification and point size mixing. Thus, if you select a position which contains a zero (no lens) the program will go into a loop for it cannot divide by zero. In addition, if a point size change is entered via tape it must have a corresponding value in the table. If not, the machine will halt operations and indicators 1, 2, 3, 8, 11 and 12 (C87) will illuminate on the front panel of the P16-12.

Table 2-9 Lens Initialization

Memory Location	Turret Position	Data (Hex)
BCE	1	
BCF	6	
BD0	14	
BD1	9	
BD2	2	
BD3	5	
BD4	13	
BD5	10	
BD6	16	
BD7	7	
BD8	15	
BD9	8	
BDA	3	
BDB	4	
BDC	12	
BDD	11	

Table 2-10 Lens Size

Memory Location	Turret Position	Data (Hex)
900	1	
900	2	
901	3	
901	4	
902	5	
902	6	
903	7	
903	8	
904	9	
904	10	
905	11	
905	12	
906	13	
906	14	
907	15	
907	16	

Table 2-11 Multiflash

Memory Location	Turret Position	Data (Hex)
BDE	1	
BDE	2	
BDF	3	
BDF	4	
BE0	5	
BE0	6	
BE1	7	
BE1	8	
BE2	9	
BE2	10	
BE3	11	
BE3	12	
BE4	13	
BE4	14	
BE5	15	
BE5	16	

2.26 MULTIFLASH

Because the Pacesetter has the capability of using a lens from 5 to 72 point, the problem of obtaining proper density at all sizes is always present. To eliminate this, a section of memory has been assigned to contain a number of flashes for a particular lens at each turret position as shown in Table 2-11. Each memory location contains the value of two lenses. Values are not given in the table for they will vary from machine to machine. The value for any lens, originally installed, was loaded into memory when the multiflash sectionof the lens initialization tape was processed.

If a value is to change, convert the decimal number of flashes required to hexadecimal and add or subtract it from the high or low order bits of that location. You must process the complete address location, even though only one of the values is changing.

Refer to Figure 2-29 for turret position and associated point size which applies to your machine.

2.27 WHITE SPACE REDUCTION

The Pacesetter program provides the capability of reducing white space between characters as shown in Table 2-12. This table will allow ½ units to be subtracted from a designated typeface of a selected point size. Refer to Figure 2-29 for point size at a particular turret position. A maximum of fifteen ½ units can be subtracted from any single typeface.

Table 2-12 is arranged so that each memory location represents the four lower typefaces for one turret position and the following location represents the four higher typefaces for that same turret position.

As an example let us subtract, from a particular point size at turret position 1, three ½ units from typeface 3, two ½ units from typeface 5 and one ½ unit from typeface 6.

Referring to Table 2-12 and using the computor front panel or making a tape patch the information needed is as follows:

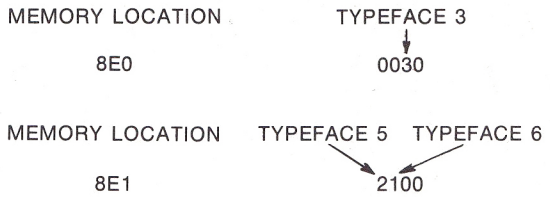
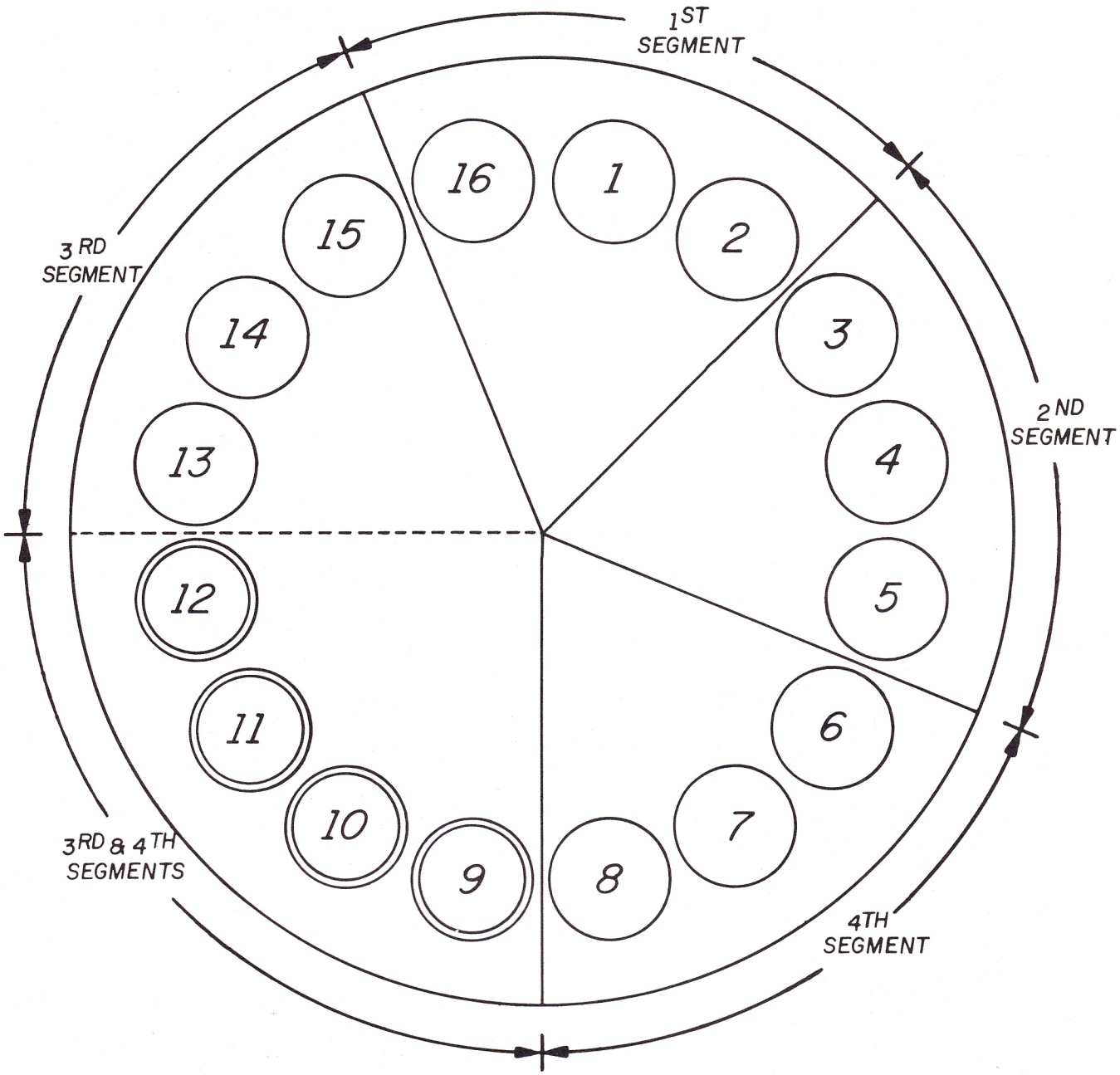


Table 2-12 White Space Reduction

Memory Location	Turret Position	Typefaces (Hex Position)
8E0	1	1 2 3 4
8E1	1	5 6 7 8
8E2	2	1 2 3 4
8E3	2	5 6 7 8
8E4	3	1 2 3 4
8E5	3	5 6 7 8
8E6	4	1 2 3 4
8E7	4	5 6 7 8
8E8	5	1 2 3 4
8E9	5	5 6 7 8
8EA	6	1 2 3 4
8EB	6	5 6 7 8
8EC	7	1 2 3 4
8ED	7	5 6 7 8
8EE	8	1 2 3 4
8EF	8	5 6 7 8
8F0	9	1 2 3 4
8F1	9	5 6 7 8
8F2	10	1 2 3 4
8F3	10	5 6 7 8
8F4	11	1 2 3 4
8F5	11	5 6 7 8
8F6	12	1 2 3 4
8F7	12	5 6 7 8
8F8	13	1 2 3 4
8F9	13	5 6 7 8
8FA	14	1 2 3 4
8FB	14	5 6 7 8
8FC	15	1 2 3 4
8FD	15	5 6 7 8
8FE	16	1 2 3 4
8FF	16	5 6 7 8



NOTE:

THE ABOVE SEGMENTS, AS VIEWED FROM THE FRONT OF MACHINE, CAN ONLY CONTAIN THE FOLLOWING POINT SIZES:

SEGMENT 1 - 5, 6, 7
SEGMENT 2 - 8, 9, 10, 72
SEGMENT 4 - 18, 24, 30
SEGMENT 3 & 4 - 36, 42, 48, 54, 60, 72
SEGMENT 3 - 11, 12, 14, 60

Figure 2-29 Lens Positions and Point Sizes

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